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HOW TO:

SPEED UP AN OLD PC

MAKE THE MOST OF WINDOWS 8.1

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ISSUE 193 DECEMBER 2013

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TORRENTS OF ABUSE?

Bittorrent is one of the most controversial technologies around, often synonymous with piracy, but used for much more than illegal copying. It underpins a lot of software delivery, especially in the gaming arena, and has transformed how large amounts of data can be served to the world. This month Campbell Simpson takes a look into the good and bad sides of the technology, and answers a lot of questions that often arise when the subject is broached.

We have talked a lot about the importance of backing up your data in the past, but usually focus upon your PC and home network. This month we take a wider look, and cover everything from these traditional data stores to the all important information contained on your handheld devices, as well as in social media and similar services. As we move more of our information online, it is going to become more and more important to take care of it wherever it resides.

This month also marks the strange lull that comes well before Christmas, but well after the big product launches targeted at it. With Windows 8.1 out by the time you read this, we thought it prime time to look at the ways in which you can give your old PC a new lease on life, while also checking out some great Mini-ITX motherboards and AMD's new GPU lineup for those wanting to start anew with their PC.

John Gillooly
E jgillooly@haymarketmedia.com.au

Also, don't forget to check out the iPad version, packed with exclusive interactive content complementing the regular magazine. Here's a sample of what you can expect:

- ▶ **Video:** Get video tutorials, game trailers and more
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- ▶ **360 View:** Get up close with tech from every angle.
- ▶ **Get the app:** *PC & Tech Authority* for iPad http://tinyurl.com/iPADPCTA

THE TEAM...

Managing Editor
David Hollingworth
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I'm hankering for the Xbox One, if only because I predict Ryse will be even better than Halo was on the Xbox 360. NOT.

Video Producer
Josh Lundberg
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I'm sick of what Samsung does to Android, and just wish Google would lift the lid on the Nexus 5 already!

Art Director
David West

I'm like a more suave and sophisticated version of that Tim Frawley guy who put his honeymoon before deadline.

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Please limit letters to 200 words, where possible. Letters may be edited for style and to a more suitable length.

LETTER OF THE MONTH

I have re-subscribed for another two years to *PC&TA* recently and thought I would email a suggestion for the magazine looking into the future. I know the KitLog covers this a bit but not in as much detail as this suggestion.

I think it would be great if you guys added a section in *PC & Tech Authority* based on desktops and systems from different price ranges, discussing both Intel and AMD chips and having different price ranges of systems and their main purpose e.g. student, gamer, audiophile etc... Say a sub $1000, 1K-2500 and 2500-4000 setup. It would be a great read and help people choose the right systems.
J. Robards

John Gillooly says: We used to do something like that in our old sister-magazine, Atomic, but while it is useful, it can take up a lot of pages, and tends not to change all that much. At the moment we've tried to cut down on what we call 'static' pages, so we can fit in more current articles like features and reviews. It's a great idea for a feature, though, so keep an eye out down the track!

STYLISH STYLUS

Is it possible to look at a peripheral input guide of some sort in the future. I have worked through a number of devices including a Nexus 7, a Dell XPS 12.5 hybrid and a Surface Pro trying to find an easy way to teach interactive groups without needing to stand and use whiteboards and switch between Powerpoint and Onenote. With all of the "active" bluetooth stylus options going around, it would be good to get an opinion if any would match the accuracy of the Surface captive digital stylus on an Android or even a device like my XPS.

Alternatively how good is the technology like Leap Motion if you wanted a really interactive, "away from the device" experience? Many real life education facilities, especially in hospitals, have projection equipment, but from the last decade, so need direct VGA connection. Again there are multiple Wi-Fi options for plug in dongles but there seems heaps of variably useful options.
A. Haughton

John Gillooly says: Hmm, not a bad idea on the input guide. Between plug in keyboards and styluses (is that the right plural?) there are a lot of options out there. As to the Leap Motion, well, we've reviewed that this issue and it's a little... disappointing.

HONEYBALL HATE

It shouldn't surprise me, but 3/4 of this article on ranting at how bad Windows 8 updates are and how poor Office 2013 comes with a small section on how great OS 10.9 is. Someone get this guy a dose of reality. Office 2013 is a marked improvement over its predecessors and if the animations are that bothersome, maybe think about upgrading your twenty year old PC if it's that bad. Please use Google OS or stick with the Mac OS and its massive array of software... And overpriced hardware and bugs.
I. Hollis

LETTER OF THE MONTH
This month's letter of the month will receive the STM HOOD laptop backpack thanks to the guys at STM.
www.stmbags.com

TOP SITE COMMENTS

C'mon Nestlé, iPhone version of the Nespresso, so my coffee will be ready as I walk through the door after taking the dog for a morning walk.
amcmo wants it all.
Web ID: 360713

Twitter on mobile is becoming frustrating. With Twitter's own app having an appalling lack of functionality and the limits placed on the APIs of all the third party apps, this is just another reason Mobile Twitter is getting less and less interesting.
firewuff prefers Twitter's old stuff, to its new stuff.
Web ID: 360423

About time consoles were able to be easily customisable. This is the main argument against gaming consoles and is a very valid issue. Good on Valve for providing an idea different to the giants.
Haratu is all for Valve's Steam Machine.
Web ID: 359723

I felt this was very well done. As an "old" fan of the Legend Of Zelda, I saw so much attention was paid to making it right on par with Zelda. Cute, funny... and very touching.
anolesole loves the Zelda fan film we shared.
Web ID: 360217

Semi-flexible screens will make for VERY robust phones! +1 from the guy who breaks stuff.
photohounds muses flexible phones from LG.
Web ID: 359395

Want to read more? Go to www.pcandtechauthority.com.au and search for the Web ID. And check out the Atomic forums: http://forums.atomicmpc.com.au

CONTENTS

ISSUE 193
DECEMBER
2013

FEATURES

XMAS GIFT GUIDE
We gather all the products we'd love to find under our tree this holiday season. Whether you're a mobile gadget lover or a PC enthusiast, there's something for everyone! **14**

BIT TORRENT
Discover how the peer-to-peer file sharing technology works, who uses it, and what it's for – apart from piracy! **24**

BACK UP YOUR LIFE
Find out the best ways to keep your data safe, secure and backed up – no matter where you are, or what device you're using **32**

TECHDESK

INBOX
Your letters answered **5**

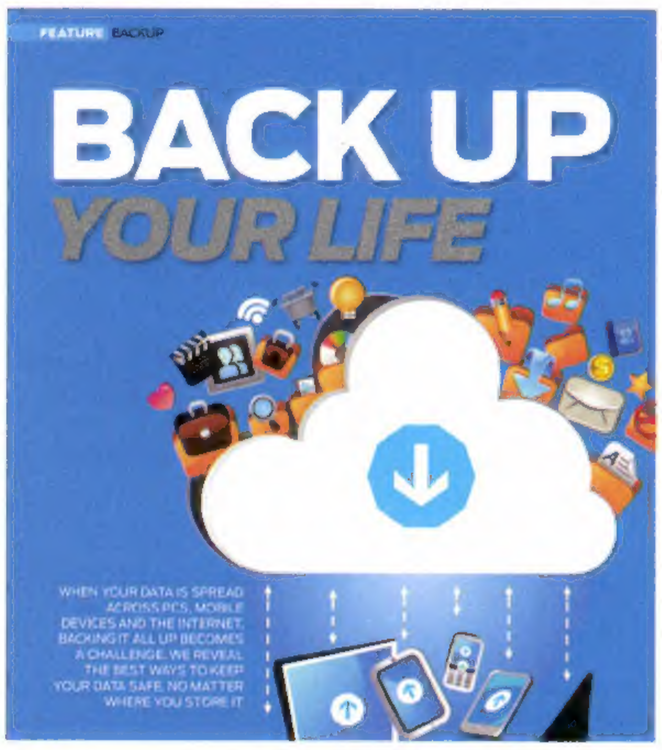
PRODUCTS & TRENDS
All the technology and gaming news that's fit to print **8**

INVESTIGATOR
Essential consumer advice **13**

HOW TO

SYSTEM BUILDER
Bring your old PC up to speed with some strategic upgrades **86**

HOW TO: Make the most of Windows 8.1
Here's what you should be looking forward to in Microsoft's latest OS update **90**



DVD CONTENTS

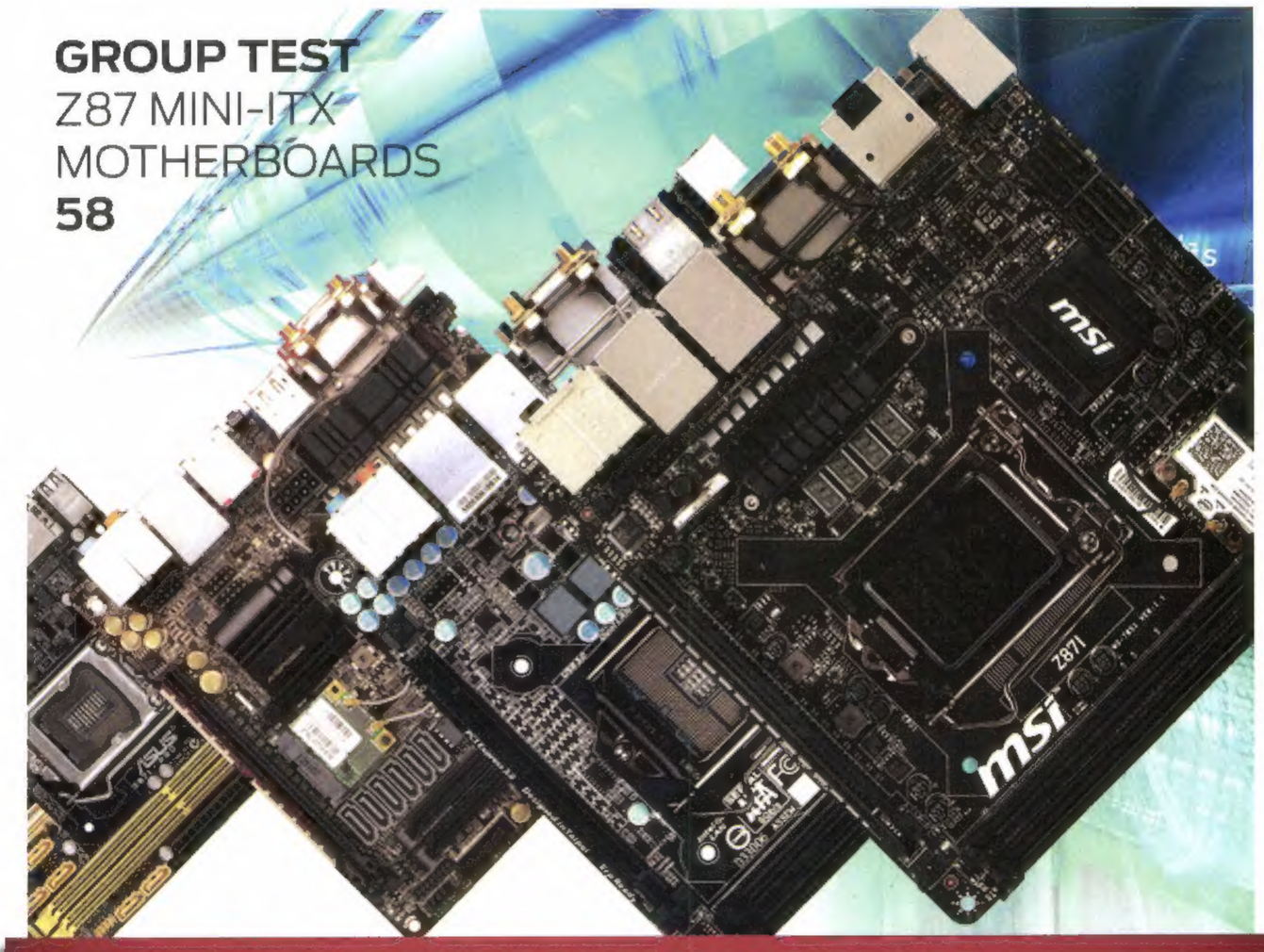
This month's disc comes with a security package and secure Linux distro **98**

SUBSCRIBE & SAVE!
Get *PC & Tech Authority* delivered! Page 82

PREVIEW
XBOX ONE
69

REVIEW
CORSAIR
CARBIDE 540
53

GROUP TEST
Z87 MINI-ITX
MOTHERBOARDS
58



REVIEWED THIS ISSUE...

HANDHELDS

iPhone 5s 44
iPhone 5c 44
Nokia Lumia 1020 47
Samsung Galaxy Note 3 51

PERIPHERALS

ASUS PQ321QE 50
Leap Motion 52
Plantronics RIG 52
Tesoro Colada 54
Ozone Rage 7HX 54
Microsoft Sculpt Comfort Mouse 54

SOFTWARE

Omny 56
Mercury Browser 56
Runtastic Six Pack 57
Launch Center Pro 57
Yahoo Mail 57
Slowcam 57

COMPONENTS

AMD Radeon R9 290X preview ... 48
Corsair Air 540 53
Fractal Design 1000W Newton 54
ASUS Radeon R9 280X DCUII TOP 55
XFX Radeon R9 280X Black OC Edition 55
Gigabyte R928XOC 55
Gigabyte R927XOC 55
Asus Maximus VI Impact 61
Asus Z87i-Pro 62
ASRock Z87E-ITX 64
Gigabyte GA-Z87N-WiFi 65
MSI Z87i 66

GAMES

Xbox One preview 69
The Wolf Among Us 71
Grand Theft Auto V 72
War of the Vikings 75
F1 2013 76

REAL WORLD COMPUTING

SECURITY
Social (networking) security **95**

IO
Our in-depth question & answer section **100**

OFFICE
Getting it done **102**

WINDOWS
So how about motion control? **106**

THE A-LIST

Only the best of the best make it to *PC & Tech Authority's* A-List **78**

EPILOG

Jon Honeyball on the great commute **114**

TECH NEWS

LATEST TRENDS AND PRODUCTS IN THE WORLD OF TECHNOLOGY

MILLIONTH RASPBERRY PI ROLLS OFF PRODUCTION LINE

RASPBERRY PI FOUNDATION ANNOUNCES THAT ONE MILLION OF THE DEVICES HAVE NOW BEEN MADE IN WALES

The millionth Raspberry Pi has been made, just 18 months after the low-cost computer was launched.

The Raspberry Pi, which was launched last year, was originally manufactured in China, to help keep costs of the $US25 computer down. Production was later shifted to Sony's factory in South Wales, where a million of the units have now been manufactured.

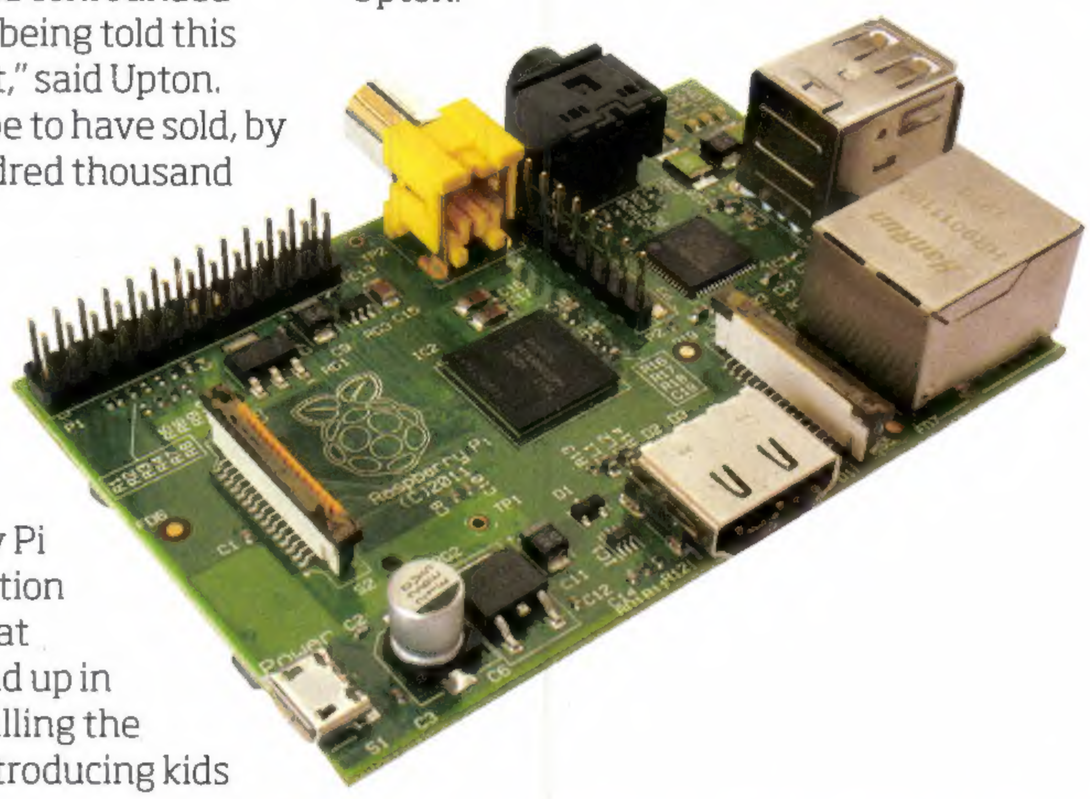
Raspberry Pi founder, Eben Upton, told the BBC that the device had confounded the doubters. "I remember being told this was an unsaleable product," said Upton. "Our ambitions were maybe to have sold, by this point, a couple of hundred thousand Raspberry Pis."

"But we've already surpassed the sales of the BBC Micro - my childhood computer. There was a latent need for something like this."

Although the Raspberry Pi has seen widespread adoption in schools, Upton hopes that more of the devices will end up in the hands of children, fulfilling the project's original goal of introducing kids to programming. "It still really is early days," he said. "I reckon maybe 75 or 80% of Pis are going into the hands of adult hobbyists. We are now at the point where we've got 200,000 of them in the hands of kids."

The Raspberry Pi has been a very British success story in a market dominated by US and Asian firms.

"It's shown that we can do first-class engineering in the UK, and that we can do low-cost manufacturing in the UK too," said Upton.



WINDOWS 8 GROWTH SLOWS

WINDOWS 8 HAS RETURNED TO A STEADY GROWTH RATE AFTER LEAPING THE PREVIOUS MONTH, ACCORDING TO ONE STATS COMPANY

After a big leap from 5.4% global market share in July to 7.4% in August, Net Applications' data showed Windows 8 climbed to 8% in September.

The slowing growth rate is almost certainly down to northern hemisphere office workers - who tend to use older operating systems - returning to work after the summer holidays.

Net Applications showed Windows 7 also gaining almost a full percentage point, while XP and Vista continue to decline steadily.

Overall Windows holds 90.8% market share on desktops and laptops globally.

Those stats are backed up by rival analytics' firm StatCounter, which showed Windows 8 had a 7.5% market share globally, but which includes PC OSes as well as mobiles.

NEW BONDI JUNCTION STORE BRINGS A TOUCH OF CLASS TO HIGH-TECH SHOPPING

THE MOVE STORE IS AIMING TO BRING A CURATED, FASHIONABLE ANGLE TO SHOPPING FOR TECH – BUT IS IT ALL JUST WELL-DRESSED HOT AIR?

To be perfectly honest, we'd really not been looking forward to the "first of its kind retail experience", Move at Bondi Junction. I mean, any brand that embraces the term 'fashtronics' has got to be suspect, right?

Well, maybe, but it's entirely possible the Move team are onto something, delivering a great range of technology, all very stylish, backed up by excellent service with some exclusive brands.

Move's very proud of its buying power, but if pure economy is what you're after perhaps JB Hi-Fi is more your style. Move is aiming at a higher-end crowd, and opening its first store in the heart of the Eastern Suburbs, at Bondi Junction's Westfields shopping centre, is part of the store's mission statement.

It's actually a very clever range of gear. There are laptops and ultrabooks, tablets, a tonne of phones at all price points, cameras and headphones. There are essentials like SD cards and batteries, even SIM cards, as well as all manner of cases for everything in the store. Brands on show include Apple and Samsung (cheekily placed on the same table), Beats, ASUS, Belkin and Netgear, and an exclusive range of highly artsy Apple cases by apparent 'fashion duo' Romance Was Born.

All of this is wrapped up in a shop fitout that aims to be as cool as the tech it's selling. Natural wood fittings accentuate, and there's even a scent in the air. The staff are multilingual, the music is smooth, and the shop's highlight is an ever-changing selection of ten curated bits of tech chosen by a New York fashion blogger.

To be honest, it's not a shop for most of us – but if you really do want to shop with the high-end fashion it crowd (not IT Crowd!), this is the location.

GOOGLE BUYS FLUTTER FOR GESTURE RECOGNITION

GOOGLE HAS BOUGHT GESTURE-RECOGNITION FIRM FLUTTER, WHICH DESCRIBES ITSELF AS A KINECT FOR OSES

Flutter uses a standard webcam, with the software detecting your hand and using it to navigate through selected apps – such as Spotify, Chrome and iTunes – on Windows or OS X.

The terms of the acquisition weren't revealed, and Flutter said its apps would remain available for existing users, and they were still available for download at the time of publishing.

"When we started three years ago, our dream to build a ubiquitous and power-efficient gesture recognition technology was considered by many as just 'a dream', not a real possibility," said CEO Navneet Dalal in a post on the Flutter website. "Since then, we have strived to build the best machine vision algorithms and a delightful user experience."

He said that research would continue – and expand – at Google, saying "we're excited to add their rocket fuel to our journey".

While Microsoft's Kinect has been around since 2010, gesture recognition is only now starting to push into computing – notably with the Leap Motion controller, which is being integrated into an HP laptop.

However, some early reviews of Leap Motion suggests the gesture recognition isn't quite ready for regular use, so we'll just have to wait and see how this move to desktop motion control works out.

GOOGLE WEB DESIGNER

PROVIDES USER-FRIENDLY MEANS OF BUILDING INTERACTIVE WEB SITES

GOOGLE HAS UNVEILED THE FIRST PUBLIC BETA OF GOOGLE WEB DESIGNER, ITS HTML5 WEB CODING TOOL FOR MAC AND WINDOWS

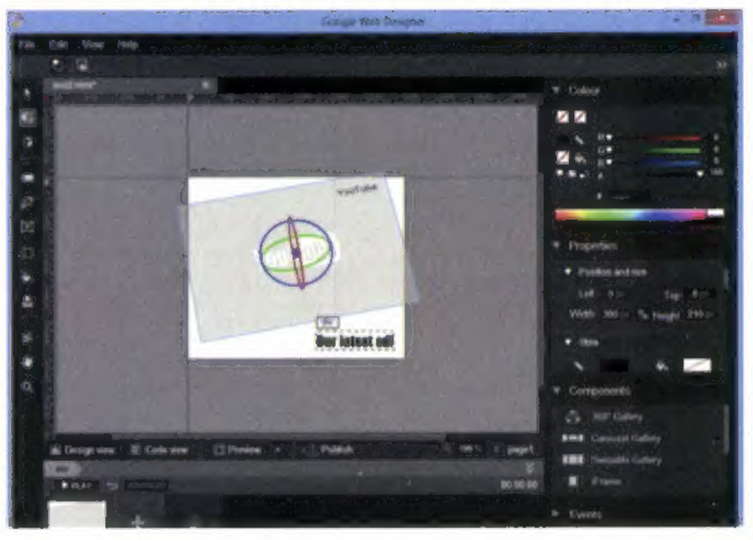
Although geared towards advertisers looking to build rich interactive web ads using HTML5, CSS3 and JavaScript, Google Web Designer can also be used for a variety of wider applications.

The app has been launched as part of Google's drive to make it easier for advertisers to code content for a variety of platforms – mobile and desktop – using HTML5. The idea is that users can simply design the ad and it will work seamlessly across multiple devices with no additional tweaking required.

The current beta – although capable of creating a wider array of single-page web sites – is clearly geared mainly towards advertisers in this initial release, with certain tools unavailable for other uses. It utilises a familiar, design-based user interface that will put those used to DTP and image-editing tools at ease with their work environment.

Despite the user-friendly interface, Google Web Designer is packed with powerful features to help users create 3D content using CSS3, build scene-by-scene animations using timelines and delve directly into the underlying code using a dedicated Code view with syntax highlighting and code auto-completion to help speed things up.

The tool will compete directly with paid-for offerings from the likes of Adobe with its Muse and Edge Reflow products, but has the obvious advantage of being completely free. Google Web Designer Beta (**http://tinyurl.com/lgddvdd**) is available now as a freeware download for PCs running Windows 7 or later, and Macs running OS X 10.7 (Lion) or later.



HOT... OR NOT

HOT

RAZER

We used to be a little dismissive of a lot of Razer's work, but we're in love with everything the company's releasing at the moment, from mice to keyboards. And especially the Blade laptops and Edge tablet.

NOT

LOGITECH

Once the king of the peripherals roost, Logitech's lost a lot of ground when it comes to keyboards and mice, not helped by the fact that many of its best designers have moved to competitors like Corsair.

GAMING NEWS

ALL THE NEWS THAT'S FIT TO PRINT FROM THE GAMING WORLD

XI3 ANNOUNCES PISTON CONSOLE PRICING AND AVAILABILITY

IS IT A STEAM BOX, A STEAM MACHINE, OR SOMETHING ELSE ENTIRELY? XI3 RELEASES DEETS ON ITS MINI-PC

The Piston device was unveiled at CES this year as a tiny, Valve-funded, lounge-room gaming PC. For a while, it was the SteamBox we'd all been waiting for - and then it wasn't, as Valve announced its own plans in that direction. Last week, it went further and announced its Steam Machine spec, and Xi3's Piston wasn't to be seen.

Until now.

Xi3's finally announced general availability and pricing for what it's now calling its PISTON Console. We're waiting to hear back about availability outside the US, but there it's going to be available on November 29, and come with a retail price of $US999.

Inside the aluminium chassis - which is a bit larger than a cricket ball - there's a quad-core, 64-bit x86 CPU running at 3.2GHz, and 384 discrete, programmable graphics cores, all backed up by 8GB of RAM. Xi3's using a 'tri-board' design, and will release future hardware upgrades that can easily be slotted in and out of the PISTON.

Connectivity is via three display ports, 12 USB ports of various flavours, audio ports, and more. And it boasts a minimum of 128GB of solid state storage, which is one of the reasons Xi3 gives for the unit's price.

There is no news on local availability - yet.

BLIZZARD TO SHUT DOWN DIABLO III'S REAL-MONEY AUCTION HOUSE

BLIZZ ADMITS IT MIGHT HAVE BEEN KINDA-SORTA WRONG ABOUT LETTING FOLKS TRADE CASH FOR LOOT IN DIABLO III

Well, here's one that might make anyone still playing Diablo III - and they are definitely out there in numbers - a little bit happier. Blizzard has announced it's closing down the Auction House, effective from March 18 next year.

"When we initially designed and implemented the auction house system, the driving goal was to provide a convenient and secure system for trades. But after much review and player feedback, it became increasingly clear that despite the benefits of the AH system and the fact that many players around the world use it, it ultimately undermines Diablo's core game play: kill monsters to get cool loot."

Is it too much to hope that the next thing they do is implement some offline play?

The change to the Auction House - well, not so much change, as scrapping - goes alongside the game's new Loot 2.0 system. Blizzard's confident the changes will make Diablo III much more rewarding.

So, DIII players - is this a good thing?

VALVE ANNOUNCES STEAMOS

STEAM FINALLY REVEALS ITS OWN OPERATING SYSTEM, WITH FULL STREAMING AND MEDIA FUNCTIONALITY

Valve has revealed that Steam is coming to a new OS, and "we've come to the conclusion that the environment best suited to delivering value to customers is an operating system built around Steam itself."

It further goes on to say that SteamOS "combines the rock-solid architecture of Linux with a gaming experience built for the big screen," putting together the already-present Big Picture mode designed for lounge-room TVs and console-controllers with the native Linux port of Steam and its current crop of games.

But there's more below the surface of this announcement, and something that it definitely needs: SteamOS will also enable a new streaming function which allows you to run games from a Windows or Mac Steam client to a SteamOS box in the lounge-room – neatly side-stepping the relatively small sample of native Linux titles (300 at the time of writing) and ensuring the Linux client is not a barrier to entry. This is quite brilliant, given the biggest complaint about Valve's native Linux support isn't Steam itself, but the range of games available for the platform. The question, of course, is how well the streaming system will work over a standard home network (and does this include Wi-Fi networks, which are usually slower and prone to interference?).

SteamOS will also integrate the recently announced Family Sharing feature and an as yet unreleased music, TV and video service putting SteamOS firmly in the sights of Microsoft's Xbox One and Sony's PS4 as it attempts to become your home and lounge-room entertainment hub.

And if there's one thing we've learned from Microsoft's dominance of Windows in the last few decades, thanks to a world powered by cheap ubiquitous hardware, it's that cheap ubiquitous hardware will always win out over proprietary appliances. Why buy an XBox One or a PS4 when you can not only have all the same features, but with more powerful hardware and an entire ecosystem of PC gaming past, present and future at your fingertips?

Wireless woes and the long wait for the NBN

ROSALYN PAGE INVESTIGATES THE STATE OF PLAY FOR OUR NATIONAL BROADBAND NETWORK, AND WHAT A NEW GOVERNMENT MAY MEAN

The angry debate over the national broadband network (NBN) between politicians, experts and users alike shows that people realise a lot is at stake with the future of the internet. It's an everyday tool that people have come to increasingly rely on to run their lives. One reader's situation shows much needs to be done if we're to really get the NBN we need.

Now that the dream of the full fibre network has taken too long to realise and has been abruptly interrupted by the change of government, it's not clear exactly what will happen with the NBN.

The Coalition's proposed fibre to the node (FTTN) network will rely on the existing copper phone infrastructure for the last section to premises and they're proposing to use technology such as vectoring to boost speeds.

The arguments around whether this is a long-term plan for the NBN have raged for the last few years and many people haven't given up hope that the government might opt for the full fibre to the premises (FTTP) network that was underway.

The Minister, Malcolm Turnbull, has indicated that the current construction with fibre as well as satellite and fixed wireless that has commenced will continue. Before any new work is started, there will be a review into NBN Co's commercial progress as well as an audit into the NBN design and a review into the long-term structure and regulation of telecommunications.

Unfortunately, that leaves many, many areas of the country with a huge question mark over them in terms of what NBN they'll see. As the nation awaits the outcomes of these three reviews into the NBN, internet users are struggling with slow speeds and insufficient services in many areas of the country.

There are people who won't benefit from vectoring because the copper is so degraded, non-existent or they're too distant. One of those is Bob from Gulmarrad, who wrote to Investigator about his BigPond mobile broadband.

"There are people who won't benefit from vectoring because the copper is so degraded."

He uses his wireless broadband with his LG smart TV, but it isn't without its problems.

"I have wireless broadband, for which I pay $49.95 per month. I have been trying now for over nine months to get an answer from BigPond as to why I'm unable to watch BigPond movies without it being interrupted to the extent you turn off.

"The download speeds I'm getting are between 5.06Mbps and 0.23Mbps with the average speed being 3.5Mbps. In the higher range 5Mbps, things are reasonable but it rarely lasts."

Investigator approached Telstra about the situation. A rep said that the telco doesn't recommend using wireless broadband with the smart TV service.

"The speeds are typically more variable over a wireless service and latency (responsiveness) can also be an issue. A minimum data speed of 3.5Mbps is required to enjoy the BigPond TV service and more information can be found here: **http://go.bigpond.com/tv/bptv/how_do_i_get_it/lg**."

Telstra confirmed that Bob's location means he can't get proper internet. "Unfortunately, due to his distance (along the copper cable) from his local exchange, Mr Noonan is unable to receive a fixed line broadband service."

Bob wants more information on the speeds he can expect with his wireless broadband and has been in touch with Telstra's technical assistance on many occasions to get help. Telstra looked into and said the network and speed were okay.

"We have investigated Telstra's mobile network in the Gulmarrad area and have found that the network is operating normally. The speeds Mr. Noonan states he is receiving are within the typical range and are what is to be expected for his location."

Consulting the NBN Co's rollout map, it shows that Gulmarrad is marked as green. This means that under the previous government's plan, construction was to commence within three years – a pretty long wait for a proper network. Under the new government's plan, all we know is that it won't be part of the current rollout underway.

Bob's situation is an example of one of the problems of relying on the copper network for the NBN. It may not benefit from a node and VDSL if it can't currently access fixed lined broadband services. It could certainly benefit from a fibre connection.

Previously many people like Bob where left with a long wait; now they're left with a question mark and a possible boost to current broadband speeds in the future, if they're lucky, to be announced next year.

ROSALYN PAGE has been a journalist for over 10 years specialising in the areas of consumer issues, technology and lifestyle. Rosalyn is the 2008 winner of the Best Consumer Technology Journalist at the IT Journalism awards. Her work is published in a range of newspapers and magazines

HAD AN ISSUE AS A CONSUMER? INVESTIGATOR CAN HELP.

Email: investigator@pcandtechauthority.com.au

XMAS GIFT GUIDE

THE HOTTEST PRODUCTS THAT WE WANT TO GET OUR HANDS ON THIS CHRISTMAS

FOR THE ENTHUSIAST

APC BACK-UPS PRO

For the home and office, APC's Back-UPS Pro models are uninterruptible power supply (UPS) systems designed to protect against data loss, computer damage and expensive downtime. They feature the same power-saving outlets seen in APC's smaller Back-UPS models, which automatically shut off power to unused IT terminals, saving the user money through unnecessary power draw. Additionally, they feature an LCD panel to provide utility indication and have automatic voltage regulation (AVR) bypass capabilities to save energy and extend battery life.

To be honest, while a UPS is not an exciting gift, it's one that a lot of serious PC users may one day appreciate more than all the chocolate you can cram under the tree.

www.apc.com.au

AOC 72-SERIES MYSMART ALL-IN-ONE

AOC's taken its usual approach to quality monitor design and expanded into the ever-competitive All-in-One market. The new mySmart range is powered by the latest Android operating system, meaning you can combine your smartphone ecosystem with this convenient computing device.

Ideal as a low-impact, easy to use second system, the 72-series boasts infrared multi-touch control, dual or quad core processors, webcam, microphone, and stereo speakers. The IPS display delivers bright and sharp colours, and four USB inputs make for ideal connectivity options.

Available in 21.5in or 23.6in designs, this would make a great loungeroom or kitchen system.

www.aocmonitor-anz.com

OCZ VERTEX 450

One of the best things you can do to give an old a PC a sense of shiny new performance is upgrade its storage systems to an SSD. With solid state memory - no moving parts! - these drives make operating systems more responsive, start-up times faster, and loading large programs and games a breeze.

So if you can't quite afford to buy a whole new system for a loved one - or one as a present to yourself - choosing the right upgrade can go a long way.

OCZ's new Vertex 450 offers 256GB of durable storage, and comes with a 3.5in adapter so you can fit it into any PC case.

www.ocztechnology.com

With APC Back-UPS, your digital life goes on...
even when the power goes off.

TREND MAXIMUM SECURITY

The end of the year brings a lot of family gatherings, and if you're at all like us one of the chores you'll likely be expected to take care of is PC maintenance. Friends and family you haven't seen for a year will small talk, then politely ask you - of course, the most technically minded of your social group - for a favour...

"Can you take a look at my PC...?"

So if you're sick of continually removing dodgy malware from your younger cousin's PC because of his less than savoury browsing habits, maybe get him something that will do him - and you - a big favour for the next 12 months. Trend Maximum Security is basically peace of mind in a box, protecting users, their data, and even their privacy, online.

It's just less hassle all round.

www.trendmicro.com.au

LIAN LI PC-CK101

Everybody knows that one guy or gal, the one who's really impossible to buy for. These types are so... niche in their interests and hobbies that buying them just one present is almost impossible.

You're just never going to find one thing for someone who's, say, mad keen on computing and is also a trainspotter in their non-computing spare time.

Well... actually, if you do know someone like this, you really need to get them this case from Lian Li. Shaped like an old fashioned locomotive, with an included PSU in the engine car and space for a very tiny PC build in the passenger car, the PC-CK101 (though we imagine you, like us, will very quickly just take to calling it the train case) even comes with a set of rails for its base.

This would also make the ideal case for anyone who's a keen fan of train sims. Yes, there is a perfect gift for these people. You're welcome.

www.lian-li.com

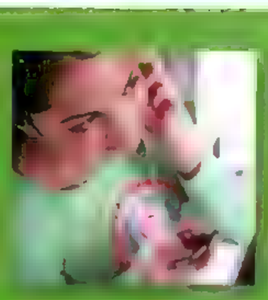
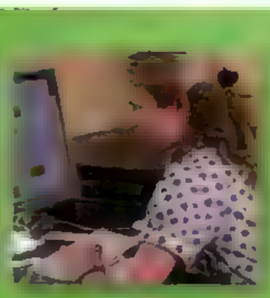
CICADA LAPTOP STAND

This is one cicada you'll be happy to see.

It's a collapsible stand designed to prop up your laptop or tablet, ostensibly to keep it cool, but it also just makes a great way to keep your hardware easy to use and see in cramped spaces - like when you're reading recipes of your iPad in the kitchen.

It's small enough to fold up and keep in a bag, too, though with one big caveat. We've learnt the hard way that when going through boarding at the airport, these items look MIGHTY suspicious. You have been warned!

www.ergofurniture.com.au/cicada

Power up to WIN 1 of 3 APC ES700G Battery Back-UPS units!*
Visit www.apc.com/promo Key Code 53464K
APC™
by Schneider Electric

FOR THE GAMER

TT ESPORTS POSEIDON

One of the great issues with a lot of gaming keyboards is find the right board that both delivers quality and also fits your gaming space. After all, not all of us have all the room in the world, often sharing studies and other rooms with at least one or more other PCs.

So if you want solid mechanical reliability and performance, but in a compact form factor that still manages to be full-size, Tt eSports' Poseidon is what you are after.

The Poseidon's Cherry MX Blue switches offer a swift action rated for 50 million keystrokes, full media controls, anti-ghosting that means your speed is never a setback, and is backlit to boot. All in a slim form factor that won't take up a lot of space. And it's only $99, which is a great price for a mechanical!

www.ttesports.com

MAGIC: THE GATHERING – THEROS

When you're a gamer, it's not just all about fps and high-resolution fragging. After all, sometimes you want to be able to shut down the computer, get face to face with a friend, but still be able to beat them to heck and back in order to claim the best bragging rights.

And for that, there's Magic: The Gathering.

Magic is the king of all collectable card games, and the latest Theros pack is out now and boasts 249 new cards, with random premium versions of each card in all packs. Theros is a new land of mythical creatures like hydras, gorgons and more - all waiting to be controlled by you.

And to eat the face of any friend willing to take you on!

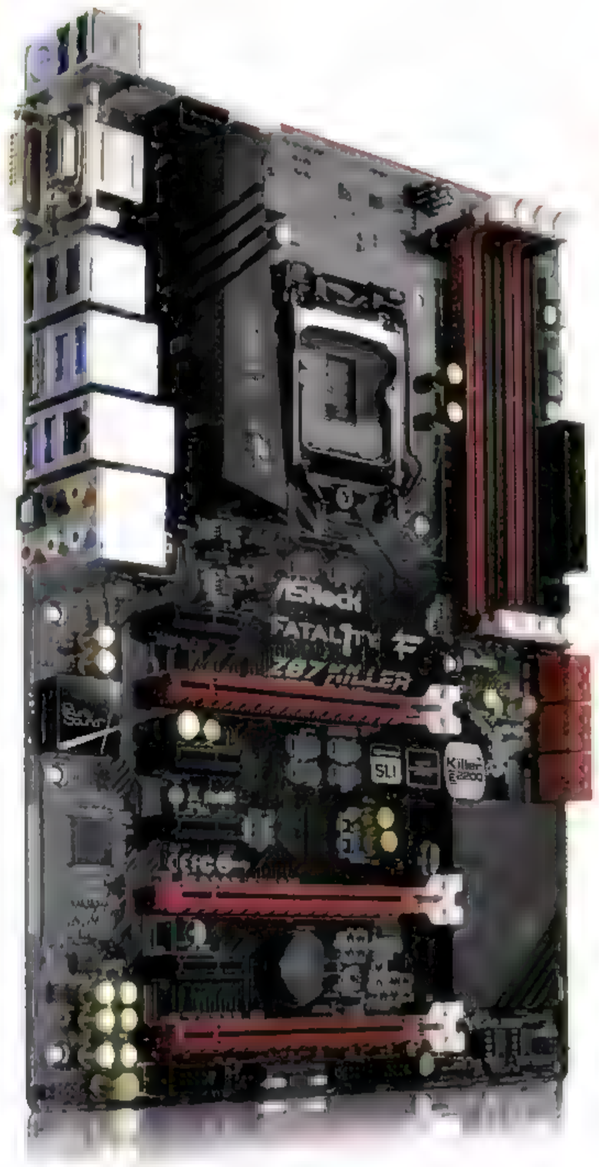
http://locator.wizards.com

VENOM 15S PRO

There's a real sweet spot when it comes to gaming laptops. You can go for huge, desktop-replacement-style monsters, but then you're pretty much tied to one spot anyway. Between sheer heft and terrible battery life, you may as well be using a desktop. But go down in size a notch, and you're still getting all the pixels, for less cash, in a form factor you can really take with you.

That's where the 15S Pro excels. With a Blu-ray drive, a gorgeous display and solid sound, powered by a GTX 765M, this is a convenient mobile powerhouse.

www.mln.com.au



ASROCK FATAL1TY Z87 KILLER

Still looking for a fancy gift for your gaming geek friends/ families? ASRock's first Killer LAN-integrated motherboard - Fatal1ty Z87 Killer - will be the best fit! With the combination of gaming-oriented Killer LAN, Gaming Armor and Key Master, feverish players may game carelessly with "NO LAG, JUST FRAG!"

www.asrock.com

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The world's fastest WiFi

Get your tunes and videos streaming faster and further around your home with next generation WiFi, **802.11ac**. Beamforming+ provides a more reliable connection so you'll be able to keep the party going from the lounge room to the backyard.

Does your new device support **11ac?** What are you waiting for?

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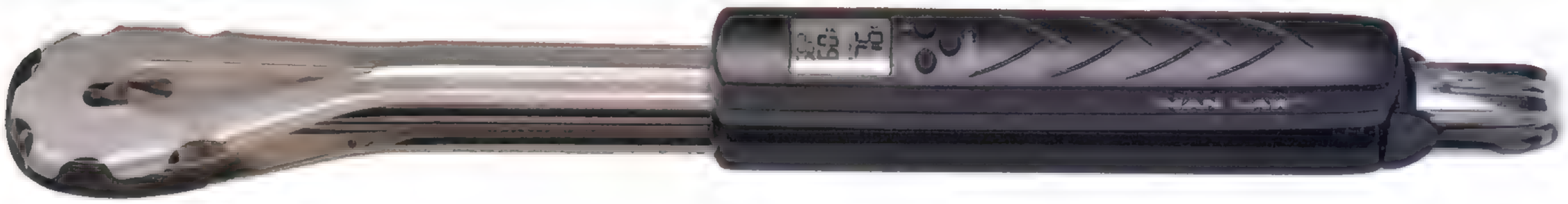
For more reliable connections.

Upgrade to 802.11ac WiFi

netgear.com.au/party

FOR THE CONNECTED HOME



BELKIN WEMO

Belkin has long had a lock on home networking, but it's recently started extending that expertise into home automation, as well, all powered by simple Wi-Fi connectivity and smartphone apps, rather than hyper-expensive automation servers.

The Wemo range includes Wi-Fi connected light switches, baby monitors, and motion sensors, in a family of products designed to operate together, but that can be bought piece by piece and installed as you go. Using a series of IFTTT (If This Then That) commands, you can personalise everything from what turns on when you open your front door to holiday lighting, or even send messages to your phone when lights and other devices are triggered.

For simple, out-of-the-box home automation, it's one of the best solutions we've seen.

www.belkin.com.au

MAN LAW DIGITAL BBQ TONGS

In the connected home, everything is connected - and even if it can't be hooked up to the home network, well, then everything should at least be digital, right?

Enter the Digital BBQ Tongs.

Forget the stupid Man Law name. We suspect these tongs will be just as handy in the hands of women, children, even clever pets and that creepy uncle who always makes Xmas lunch a little bit painful and embarrassing. The Digital Tongs feature an LCD display and built-in digital thermometer and probe, along with presets for cooking the perfect cut of a variety of meats. Whether you want a rare steak, or perfect chicken, this is the only way to cook in the modern, connected (or at least digital) home.

www.manlaw-bbq.com.au

NETGEAR D6300 WIFI MODEM ROUTER

Upgrade to the NETGEAR D6300 WiFi Modem Router with next generation 802.11ac Wi-Fi and get your tunes and videos streaming faster and further around your home. More devices than ever before are connecting to your home network and the demands are increasing so it's important that you have the speed, range and performance you need, every time you need it.

www.netgear.com.au

NETGEAR® Get the party started.

Get your tunes and videos streaming faster and further around your home with next generation WiFi, **802.11ac.**

What are you waiting for? Upgrade today!

NETGEAR UNIVERSAL DUAL BAND WIFI RANGE EXTENDER

Get Wi-Fi where you want it on your Wi-Fi devices such as tablets and smartphones throughout your home with the Universal Dual Band WiFi Range Extender from NETGEAR. Boost dual band Wi-Fi to the backyard or upstairs bedroom and wirelessly stream music to your connected audio system with AirPlay on iPhone/iPad or NETGEAR Genie App (DLNA).

www.netgear.com.au

PANASONIC VIERA 4K ULTRA HD TV

It may be odd putting a television - traditionally a locked in consumption device, not a sharing device - in the Home Networking section, but increasingly, our TVs are becoming the heart of our homes. With an ever greater built-in array of networking functions, televisions are very much a part of any modern home network.

Panasonic's new Viera range is about as fancy and as connected as you can get, even down to a built-in camera for video communication. With face recognition, voice integration and the ability to link devices such as tablets and smartphones, this is your ultimate entertainment hub.

And getting in on the ground for 4K can't hurt, either!

www.panasonic.com.au

NETGEAR® WiFi where you want it.

Boost WiFi to your tablets, smartphones, laptops and TVs throughout your home, even to the backyard.

Boost your WiFi with a NETGEAR Range Extender

FOR THE MOBILE USER

WIRELESS MEDIASHARE

Store, Stream and Share! Verbatim's new MediaShare allows you to stream media to your tablet/smartphone from portable storage media, such as SD cards, USB drives or portable HDDs via a secure, wireless connection, wherever you are! Even better, up to 5 users can access and share stored content - simultaneously!

Whether you're on the road sharing media around a car or whatever you're travelling on, or at home just wanting to make sure that all your tablets and phones have access to your entire library, the MediaShare is the answer.

www.verbatim.com.au

BELKIN EXPRESS DOCK FOR IPAD

Belkin's new Express Dock has an adjustable dial integrated to the back of the dock. When turned, the dial raises or lowers the Lightning connector that connects to your iPad so it will work with a variety of case sizes and styles. No matter how thin or rugged your case, this dock means you never have to unsheathe your tablet.

To charge or sync an iPad, simply connect the dock to your computer with USB, or use your existing wall charger to place anywhere you need a charge. The New Belkin Express Dock for iPad also fits any iOS device with a Lightning connector, including the iPad 4th generation, iPad mini, iPhone 5/5S/5C or iPod touch.

www.belkin.com.au

NEXUS 5

While the phone hasn't been officially announced yet, we do know it's coming, and we do know it's going to be pretty good.

We're expecting the Nexus 5 to feature a 5in 1080p display, 2.3GHz Snapdragon processor, and 2GB of RAM. Backed up by front and rear cameras and - hopefully - 16GB of onboard storage, it's going to be a premium piece of kit. And it will be running the very latest version of Android, in a remarkably pure form, as you'd expect from Google.

https://play.google.com/

SONY WH WALKMAN

It's now sadly impossible to get hold of a classic Walkman - it's tech that's just about as dead as a Dodo. But that doesn't mean Sony's killed the brand.

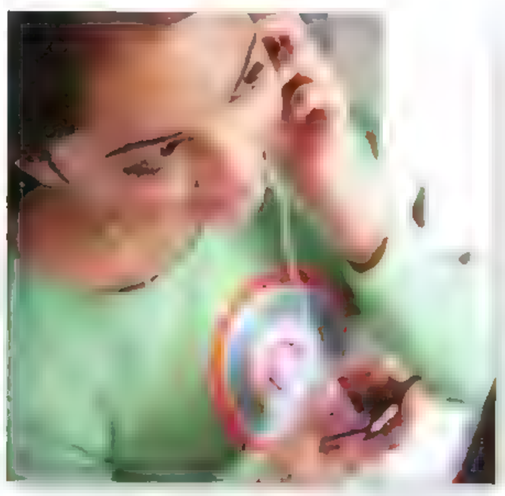
These new cans feature a unique three-in-one design that lets you enjoy music wirelessly via a media player, or out loud via built-in external speakers. The lower end model stops there, but the WH505 headset even boasts 16GB of storage, making them headphones and player, all in one stylish unit.

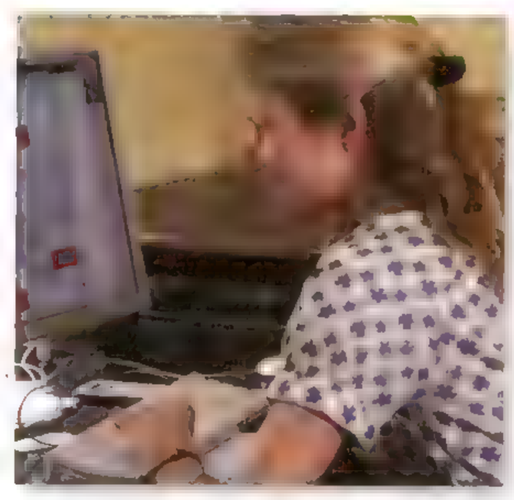
With preset sound modes for all kinds of music, this is a versatile set of headphones for all seasons.

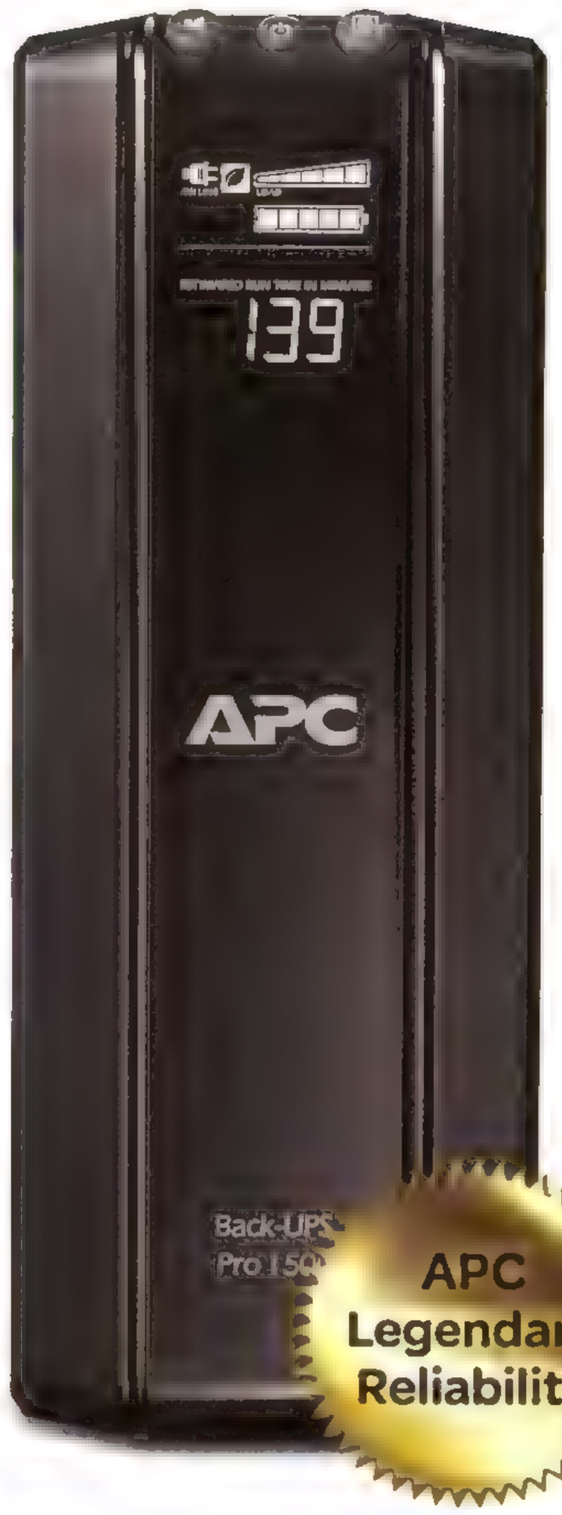
www.sony.com.au

With APC Back-UPS, your digital life goes on...

even when the power goes off.







Preserve what's most important to you.

Reliable power backup for 24/7 availability

Whether DVRing your favorite show, updating your Facebook status, or playing a live networked game, you depend on your home electronics every day, all day. That's why APC by Schneider Electric has designed battery backup solutions that protect the constant availability and connectivity you expect… and depend on.

Peace-of-mind protection on two levels

When the power goes out, our popular Back-UPS units go to work. They instantly switch your home technologies to emergency power, allowing you to work through brief power outages or safely shut down your systems so you won't lose valuable files—such as digital photos and media libraries. They also feature surge outlets to guard your electronics and data from "dirty" power and damaging power surges—even lightning. So you get two levels of protection in every APC Back-UPS unit!

Energy-saving insurance for what matters most

Our Back-UPS units protect your home office, digital living and home media applications, notebook computers, DVRs, and gaming application. And since we now offer energy-efficient models that reduce electricity costs through unique power-saving outlets, you can realise true energy savings regardless of the applications you're backing up. Throughout your home, the APC Back-UPS is the cost-saving insurance you need to stay up and running and reliably safeguarded from both unpredictable power and wasteful energy drains.

Keep your electronics up and your energy use down!

ES Series

The ever-popular ES models are priced affordably yet provide enough extended runtime to allow you to work through short and medium power outages. Some power-saving models have been designed to actively reduce energy costs.

The energy-efficient ES 700G

The ES 700G boasts innovative power-saving outlets, which automatically shut off power to unused devices when your electronics are turned off or asleep, eliminating wasteful electricity drains.

- 8 Outlets • 405 Watts / 700 VA
- 68 Minutes Maximum Runtime**
- Telephone/Network Protection

The best-value ES 550G

The ES 550 uses an ultra-efficient design that consumes less power during normal operation than any other battery backup in its class, saving you money on your electricity bill.

- 8 Outlets • 330 Watts / 550 VA
- 51 minutes Maximum Runtime**
- Telephone/Network Protection

Power up to WIN 1 of 3 APC ES700G Battery Back-UPS units!*
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**Runtimes may vary depending on load.

LUXURY TECH

SAMSUNG KN55S9C

In recent years we have become used to the advantages delivered by OLED screens on smartphones, but it has only been recently that the tech has hit big screens. This curved OLED TV set from Samsung sports a mammoth pricetag for its 1080p resolution but the image quality is astonishing to say the least. With pure blacks and vibrant colours, it shows Blu-rays and other HD content at their best (and makes free to air TV look decidedly average indeed). The subtle curved screen just adds to the appeal. If you want movies to look their absolute best, this 55in TV offers an unsurpassed viewing experience.

www.samsung.com.au

RAZER BLADE

Razer claims its new Blade laptop (the previous version, with the Switchblade UI, is now known as the Blade Pro) is the world's thinnest gaming laptop.

We'd like to say something witty and controversial about how the marketing doesn't quite stack up, but... yeah, Razer's kinda right. This really is thin, it really is powerful, and we'd really likely hurt any one of you for one of our own.

The Blade is not only thin, but it's stylish, and very powerful. With an NVIDIA GTX 756M onboard for graphics power, and an i7-4702HQ quad core processor, it delivers the frames with amazing smoothness. But for all that power, the heat management is amazingly impressive, and with 256GB of SSD storage it's pretty roomy, too. The built-in speakers sound good, the milled aluminium chassis looks good, and, well... Razer, man. Who knew we'd be drooling over Razer PCs one day?

www.razerzone.com/blade

MSI GX70

If you like your gaming power mobile and driven by AMD hardware, then MSI's GX70 is the package you're looking for.

With an aggressive, modern design, the GX70 is powered by an HD8970 graphics chip with 2GB of RAM, and an A10 5750 processor, all backed up by 16GB of system RAM. With a 17.3in display, and capability to use AMD's Eyefinity multi-display support, this is a versatile machine in the graphics department. With SoundBlaster Cinema built in, and a purpose-built gaming keyboard, it's made from the ground up for serious performance.

http://au.msi.com/

MediaShare Wireless

Portable wireless streaming to your tablet or smartphone

STORE, STREAM & SHARE ANYWHERE

SHARE

Connect up to 5 devices simultaneously to share videos, music, photos and data

USB/SD CONNECTION

Built-in USB port and SD Memory Slot allows easy access to content from a USB drive, portable hard drive or SD memory card

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Upload and Download content wirelessly from your tablet or smartphone device

EXTENDED BATTERY LIFE

Up to 5 hours of continuous battery life; Doubles as a charger for electronic devices

SECURE

Password protected wireless access to files keeps your data safe and secure

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BIT TORRENT

CAMPBELL SIMPSON LOOKS INTO BIT TORRENT TO FIND OUT HOW IT WORKS, WHAT ITS (LEGITIMATE) USES ARE, AND WHY AUSTRALIANS FIND IT THE BEST WAY TO ENJOY THEIR ENTERTAINEMENT...

WHAT IS BIT TORRENT?

If you're even slightly computer-savvy, it's highly likely that you've run into the term 'torrent' in your time on the internet. A torrent is a complicated thing - as well as referring to an actual file that you might download, it's also shorthand for the concept and infrastructure that makes the delivery of that file possible.

Torrenting, as it's often referred to, is the process of downloading data over a peer-to-peer (P2P) network. Running on the internet, a P2P network is an informal, decentralised, distributed service that sees every computer connected to that network talking to each other directly, rather than communicating through a central server.

The term 'torrent' is a shortening of BitTorrent - the official name for the decentralised download protocol developed in 2001 by American computer programmer Bram Cohen. It also accurately describes the torrent of data being delivered to a file downloader, over multiple streams from different BitTorrent users.

Confused yet? Well, we're here to help.

THE INS AND OUTS OF BITTORRENT

The way BitTorrent works is markedly different to the rest of the internet. When you watch a YouTube video or download a file off a website, your computer is accessing a single file on a single server, somewhere around the world. There's a direct computer-to-computer connection that's made, and that entire file is transferred directly from one to the other. When multiple computers want that file, the server makes direct connections with each one.

BitTorrent abandons that point-to-point transfer method. At the genesis of a file's life on BitTorrent, it's hosted by a single computer – the initial 'seed'. When one user, or 'peer', wants that file, a direct connection is made and the transfer takes place as normal. Up until now, everything happens just as it would on the rest of the internet.

When that first transfer is complete, two computers have that file – and when the next peer wants to access it, both the original seed and the first downloader are already sharing it. Both the original seed and the first downloader share their copies with the new peer, sending segments of the original file simultaneously. Since there are now two sources of that file, the transfer happens faster. Once that's complete, there are now three sources seeding the original file.

Imagine this idea multiplied a thousand times, and you've got the concept behind BitTorrent. Instead of downloading a file from a single source, you're getting it from thousands of different computers at once – and even if they only have a small amount of bandwidth each, it quickly adds up. The beauty of BitTorrent, though, is that even while you're still downloading a file, you're automatically sharing the segments you've already received with other peers. The more users there are, the faster the system.

BitTorrent relies on good etiquette from its users – if you want the system to stay fast, you have an incentive to share your files with other users after you've finished downloading them. But popular files maintain a critical mass of dedicated seeders and peers, and recent leaps and bounds in worldwide internet speeds mean that for most users, BitTorrent is not significantly slower – and in many cases, can be hugely faster – than a traditional file download.

"These numbers are pretty impressive, especially for a service that's largely used for illegal purposes."

Because it's decentralised – there's no single source for any file – BitTorrent is a relatively anonymous and secure file sharing platform. This makes it popular for sharing copyrighted materials, such as movies, TV shows, books, music, games and computer software. There's nothing shady about BitTorrent itself, of course – it just has some less-than-legal uses.

WHAT MAKES BITTORRENT WORK?

The entire BitTorrent system hinges on two components. The first is a tiny file, called a torrent. This file is, in essence, a pointer – it contains information on the data you want to download, the computers that are currently sharing a full copy of that data, and the computers that are downloading and sharing partial copies.

The torrent file itself doesn't contain any of the data you actually want to download, whether it's a movie or music or book or whatever – think of it instead as a treasure map, that tells your PC where to go and what to do.

That torrent file is interpreted by a piece of software called a BitTorrent client. There are hundreds of different clients available, but the most popular are uTorrent, Transmission and Vuze. The Opera Web browser also includes the ability to download torrent files. You can even download torrents on your tablet or smartphone.

When you load a torrent into the BitTorrent client, you're presented with a list of files that the torrent has indexed. Select the particular data that you want to download, and the client connects to all the seeds and peers it can, and starts receiving data and sharing it with other downloaders. The rest is out of your hands.

BITTORRENT BY THE NUMBERS

The official website for BitTorrent cheekily calls itself "the global standard for transferring files across the internet". During November 2004, BitTorrent was responsible for more than a third of all internet traffic worldwide. In 2009, more people used BitTorrent than used YouTube and Facebook combined. At the start of 2012, more than 150 million people around the world had installed a BitTorrent client on their computer to access the service.

In August 2013, BitTorrent was estimated to be responsible for up to 15 per cent of the world's peak-period internet traffic. As a comparison, video-sharing giant YouTube takes up around 22 per cent. If you consider internet uploads alone – people actively sharing files with the world, rather than just downloading them – BitTorrent takes up a massive 33 per cent of traffic where YouTube only accounts for 8 per cent.

These numbers are pretty impressive, especially for a service that's largely used for illegal purposes.

IS BITTORRENT LEGAL?

The BitTorrent service itself is entirely legal – there's nothing untoward about its method of connection, or its ideas on transferring data or sharing files.

Indeed, BitTorrent has thousands of legitimate uses. Game developer Blizzard uses the BitTorrent protocol, partly relying on its users' own internet upload speed, to share the game files and updates for World of Warcraft, Starcraft II, and Diablo III. Many variants of the Linux operating system are offered for download via BitTorrent. Even NASA used BitTorrent to share a super-high-resolution photo

FATAL1TY

ASRock

Z87 KILLER SERIES

No Lag, Just Frag!

Killer E2200
Game Networking

5X Networking Performance

Boosts networking performance up to 5X for time-sensitive UDP (User Datagram Protocol) based applications

Lower Latency in Online Games

Latency lowered

LOL up to 136%

Diablo3 up to 60%

DOTA2 up to 47%

* Test results may vary depend on the internet environment and time

XSplit — DOING LIVE IS SIMPLE

FREE bundled 3 Months Premium License $24.95

- 115dB SNR
- Excellent Bass
- Less Sound Distortion
- More Details
- Supports up to 600ohm headphones

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www.altech.com.au

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www.achieva.com.au

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ARC Computers	02 9748 8322	arc.com.au
Aus PC Market	02 9646 8000	auspc.com.au
Capitol Computer	02 9281 8890	capitolcomputer.com.au
IIBuy	02 9599 0698	iibuy.com.au
IJK	02 9745 0877	ijk.com.au
Megaware Computer	02 9698 1593	megaware.com.au
MSY	02 9755 0668	msy.com.au
mWave	1300 727 446	mwave.com.au
Nexcom	02 4721 3457	dlcomponline.com.au
North Shore Computers	02 9939 1548	nscom.com.au
PC Lan	02 9649 3288	pclan.com.au
PC Meal	02 9746 7886	pcmeal.com.au
D & D COMPUTER TECH	02 9742 3988	ddcomputer.com.au
DIY COMPUTERS	02 9897 9993	diycomputers.com.au
MAIG PTY LTD	02 9648 2261	maig.com.au
J&W	02 8090 3332	jw.com.au
QLD		
Computer Alliance Pty Ltd	07 3421 [illegible]	computeralliance.com.au
Game Dude Pty Ltd	07 3387 1500	gamedude.com.au
MSY	07 3290 1738	msy.com.au
Umart Online	07 3369 3928	umart.com.au
AUSCOMP COMPUTERS	07 3722 5100	auscompcomputers.com
VIC		
Computers & Parts Land	03 8542 8688	cpl.net.au
MSY Technology	03 9560 2288	msy.com.au
PC Case Gear	03 9551 0889	pccasegear.com
Centre Com Sunshine PTY	03 [illegible]	centrecom.com.au
Scorpion Tech. Computers	03 8561 3200	scorptec.com.au
NT		
PC Solutions 4 U	08 89412119	pcsolutions4u.com.au
TAS		
Principal Computers	03 6235 5000	tasmanianpc.com.au
WA		
Austin Computer	08 9201 2788	austin.net.au
MSY	08 9344 1002	msy.com.au
Netway Computers	08 9332 0888	netwaycomputers.com
Netplus Micro Computers	08 9242 7288	netplus.com.au
PC West	08 6398 4813	pcwest.com.au
PLE Computers	08 9309 4771	ple.com.au
Worldwide Net Solutions	08 9375 9666	netsolution.com.au
ARROW COMPUTERS	08 9258 7733	arrowcomputers.com.au
SA		
Hypernet Computer Distribution	08 8340 2021	hypernetdist.com.au
MATS Systems	08 [illegible] 2100	mats-systems.com.au
MSY Technology (SA) Pty Ltd	08 8212 1656	msy.com.au
IT&Computers	08 8186 2736	itwarehouse.com.au
Photech Computers Pty Ltd	08 8349 4334	photech.com.au

www.asrock.com
www.fatal1ty.com

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of the Earth from space.

Despite this, the vast majority of BitTorrent use is illegal. BitTorrent is the world's most popular platform for sharing copyrighted content – movies and TV shows are the most shared, but a huge quantity of software, PC and console games, eBooks, and music are distributed on a daily basis.

Because of this, torrents attract a lot of attention from rights-holders groups, like the American Recording Industry Association of America (RIAA) and Motion Picture Association of America (MPAA), and their local equivalents. These groups sometimes employ law firms to track BitTorrent users, usually by monitoring the unique internet addresses of those computers accessing popular torrents of files owned by their members. Occasionally they seed fake torrents, 'honeypots' of popular or rare files, to coerce users.

The next step after that is for the law firm to contact a tracked user's internet service provider (ISP), and issue a copyright infringement notice. Depending on its policies, an ISP can either pass the notice directly on to a user, issue the user with a warning, share that user's details directly with the law firm, or ignore the whole matter altogether.

There's no one set way for copyright owners, ISPs and end users to settle a copyright dispute over files shared on BitTorrent at the moment in Australia. If you're intending to download copyrighted material, though, beware – it is possible to get caught, and there are consequences.

WHAT DO AUSSIE ISPS THINK OF BITTORRENT?

There's been a long history of Australia's internet service providers cracking down on BitTorrent usage, as well as fighting for the rights of their customers to use the internet freely for whatever they want without fear of reprisals.

The biggest BitTorrent stoush happened between 2008 and 2010, when the Australian Federation Against Copyright Theft (AFACT) sued ISP iiNet for allegedly allowing copyright infringement to take place by not disconnecting users that AFACT claimed were illegally downloading movies and other data using BitTorrent.

Seven film studios ganged up to take on iiNet, saying that the ISP was promoting and allowing piracy to take place by not complying with their demands. Speaking for the rights-holders, AFACT claimed that iiNet allowed over 100,000 downloads of infringing material during its year-long investigation. At the time, iiNet refused to disconnect any of its users from the internet without each matter having gone through police and the courts.

The Federal Court of Australia found iiNet in the right in February 2010, and again in February 2011 after AFACT appealed to a full line-up of Federal Court judges. AFACT took the matter to Australia's High Court, and after a year, the case was again dismissed in April 2012. The ruling relieved iiNet of responsibility for its users' actions.

Since then, the battle between ISPs, BitTorrent downloaders, and copyright holders has continued. In May of this year, a Sydney law firm sent letters to several Australian ISPs, asking for details of users it said it had tracked downloading copyrighted material through BitTorrent. Although generally ISPs refuse to give this information out freely, it is possible for the law firm to use a legal process called 'discovery' to access the names and contact details of ISP customers responsible and to bring about lawsuits.

Other ISPs have taken less conventional steps to curb the use of BitTorrent on their networks. Telstra signalled earlier this year that it would trial a service that would slow the rate at which users could transfer files using peer-to-peer services like BitTorrent. Cut-price ISP Exetel ran a similar system for a few years to limit BitTorrent's bandwidth usage in peak hours, but has since discontinued it.

Australian ISPs also have 'fair use' provisions in their contracts with customers that allow them to disconnect a service found to be infringing copyright or breaking other rules, but generally, and thankfully for pirates, these aren't often used.

▼ Game of Thrones – almost the most downloaded show of all time, especially here!

BUT WHAT DO AUSTRALIANS ACTUALLY USE BITTORRENT FOR?

In any study of BitTorrent usage around the world, Australians are over-represented. In TorrentFreak's analysis of downloaders of the cult hit HBO

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Scorptec	1300 726 770	scorptec.com.au
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Tech Buy	02 9648 1816	techbuy.com.au

NSW

MSY	02 9648 4116
PC DIY	02 9648 1001
IT Destination	02 9211 8696
Big Ben	02 9763 5078
NorthShore	02 9939 1548
Octagon	02 8212 5161

SA

MSY	08 8212 1656
PC DIY	08 8410 0446

VIC

MSY	03 9560 2288
Scorptec	1300 726 770
PC DIY	03 9077 9811
Centrecom	03 8311 7600
CPL	03 8542 8688
Nexus	03 9663 9988

QLD

Umart	07 3369 3928
MSY	07 3217 9070
Gamedude	07 3387 1531
Computer-Alliance	07 3421 3200

WA

MSY	08 9344 1002
Austin	08 9201 2788
PLE	08 9309 4771

series Game of Thrones, Australians were responsible for a full 10.1 per cent of all downloads of an episode of the show. The US took second place with 9.7 per cent of downloads. Here's the thing, though – the US is a country of 313 million people, where Australia can only count 23 million citizens. We're almost 14 times more likely, per capita, to jump online and steal a copy of the show rather than wait until it airs legally.

MusicMetric data on online music piracy in 2012 suggests that there were four illegal song downloads for every five citizens in Australia, with a total of 19.1 million downloads tracked for that period. And interestingly enough, Australians are more likely to pirate content online the more wealthy they are – in stark contrast to the UK, where the opposite is true.

A study from the partisan Intellectual Property Awareness Foundation found that a quarter of Australians surveyed admit to using BitTorrent to illegally download TV shows and movies – and that this is by far the most popular use of the service. Pirating media is an egalitarian practice – it's split almost equally between male and female users – and adults are just as likely to pirate movies and TV shows as children are.

Downloader statistics, according to the IPAF, don't really line up with

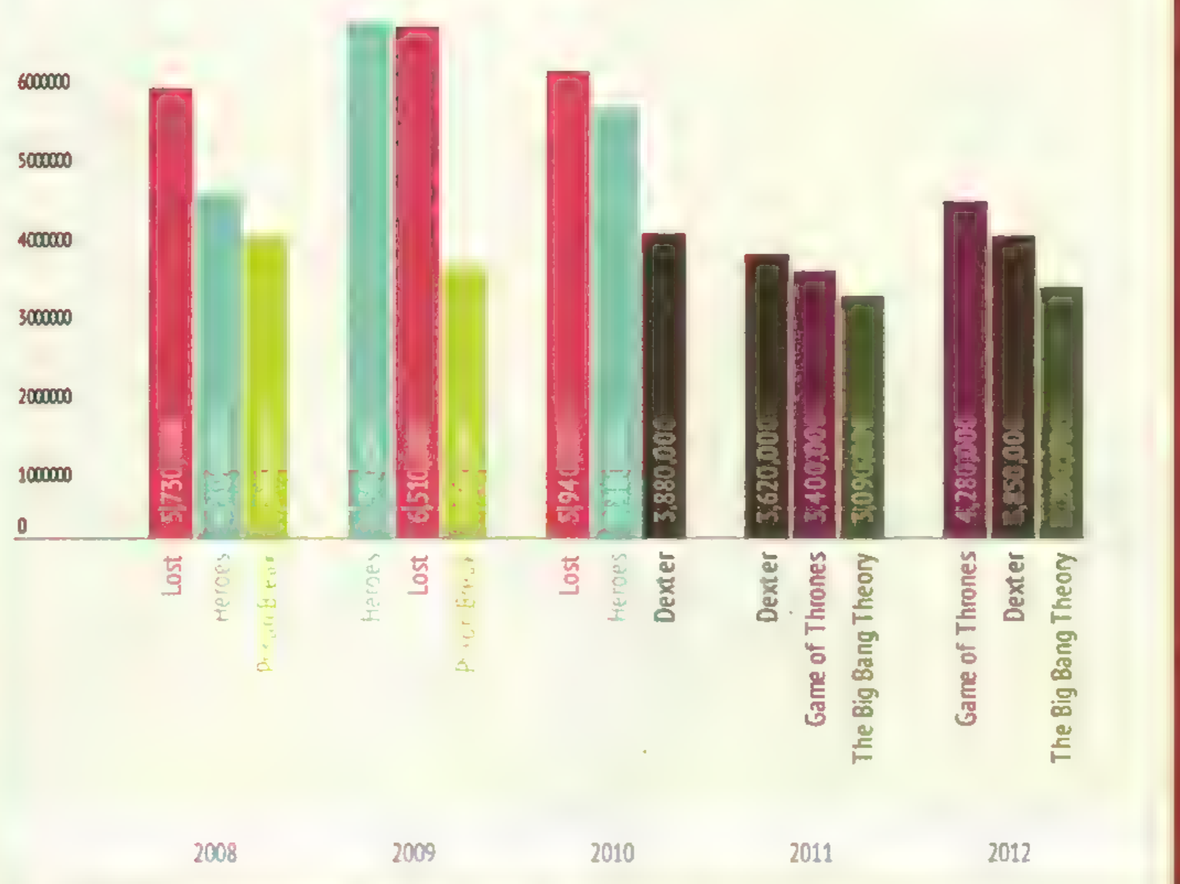
MOST DOWNLOADED TV SHOWS

This data, gathered from torrent news website **TorrentFreak.com**, is only a small proportion of the actual number of illegal movie and TV show downloads through the BitTorrent protocol; it doesn't measure downloads through private, invitation-only torrent sites, and many other sources for torrent downloads. Similarly, the TV audience numbers are only for US viewers – but you get the idea.

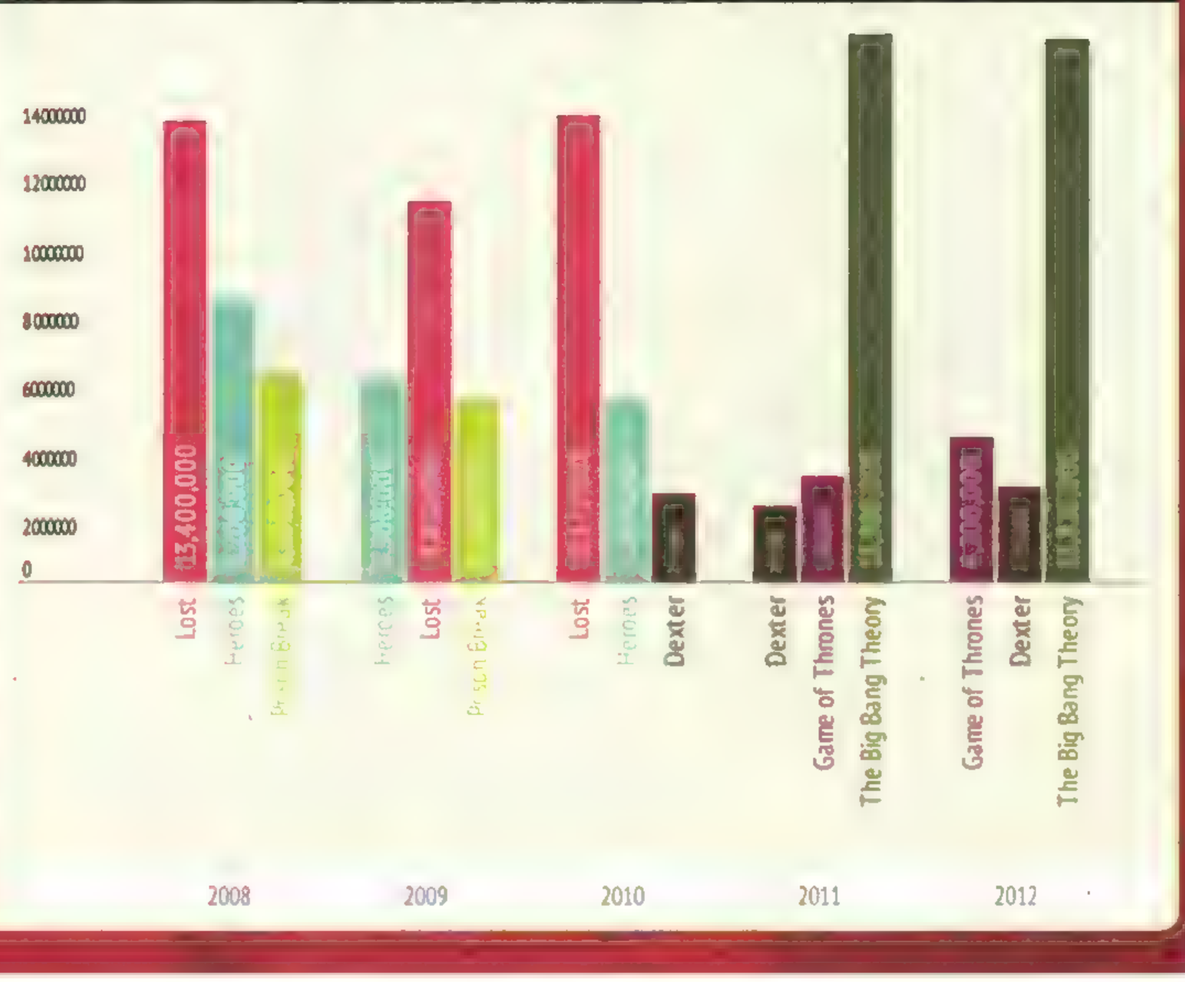
Despite these limitations, it's a good representative sample of the most popular shows and movies that have been downloaded via BitTorrent in the last five years. The data shows that BitTorrent use peaked in 2010, and has been falling since, and that some of the most popular pirated videos aren't always that popular at the box office or with traditional TV viewers.

Oh, and one other thing – we had to cut off the last chart because Avatar made way, way too much money at the box office. Sorry.

1. TV SHOWS - MOST DOWNLOADED (# OF DOWNLOADS)



2. TV SHOWS - VIEWER RATINGS (US AUDIENCE)



community expectations. Teens say that they pirate movies and TV shows because everyone else is, despite only 25 per cent of their peers doing so. The ever-present 'fear of missing out', or FOMO, drives both adults and children to illegally download shows. In an era where TV shows and movies are discussed and dissected seconds after they've aired, not keeping up with your friends' illegal habits is a legitimate concern.

WHY DO AUSTRALIANS USE BITTORRENT?

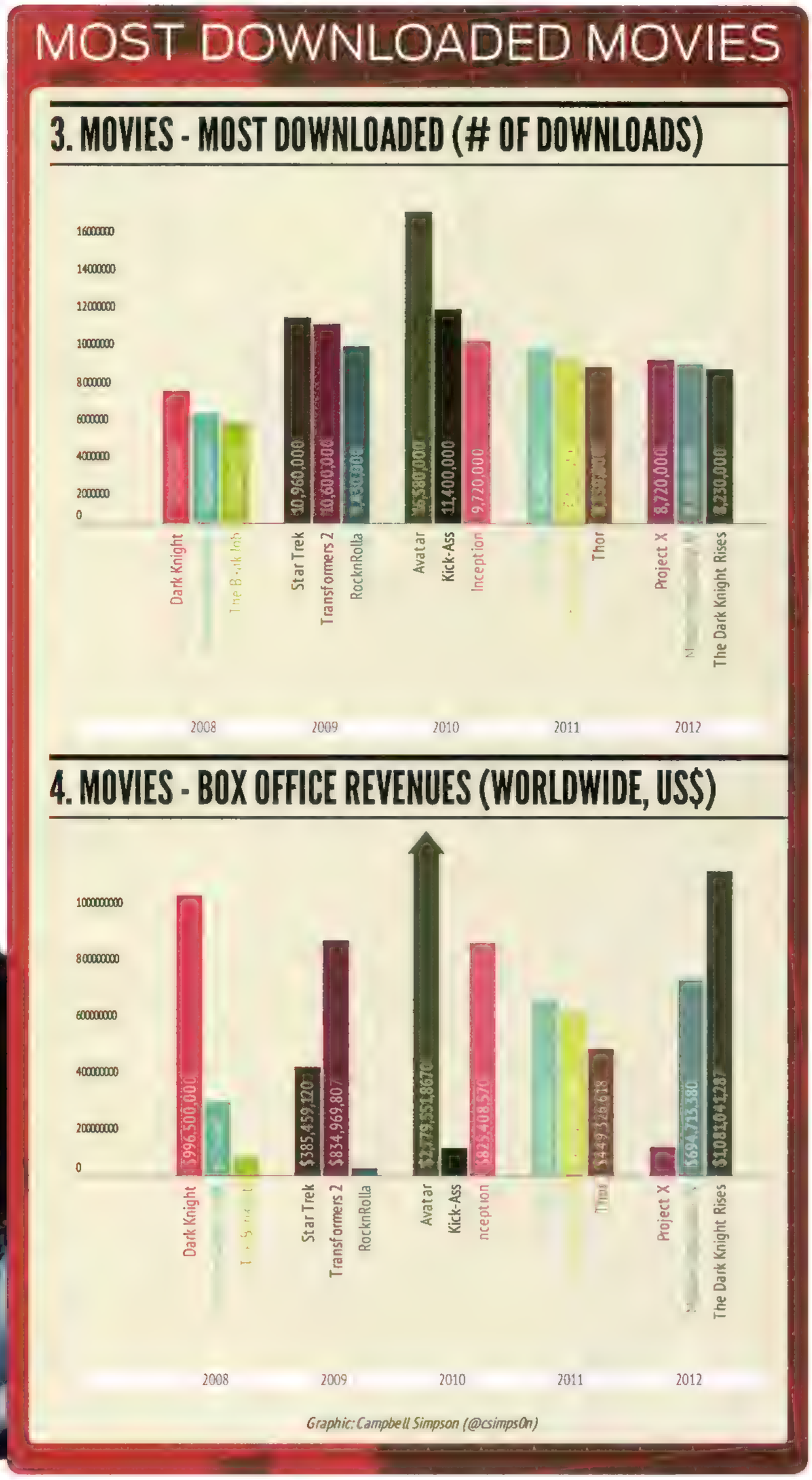
There are dozens of legitimate ways for Australians to legally access the same content that's available over BitTorrent, in almost all cases. Movies and TV shows are almost universally offered on free-to-air TV and subscriptions like Foxtel, on streaming services like Foxtel Play and Quickflix, and for download over iTunes – with both rental and purchase available. And, of course, you can walk to your local store and buy a DVD or Blu-ray.

The same is true of software – thanks to the proliferation of the internet, most software is available for digital download after purchase. It's even easier to access eBooks and streaming music, both of which are popular and surprisingly cheap thanks to strong competition.

Using movies and TV shows as an example, though, it's easy to understand why BitTorrent usage is so popular in Australia.

More than any other factor, BitTorrent is free. Apart from the cost of a computer, some storage for any downloaded files, the cost of a capable internet connection, and a miniscule amount of electricity – and all of these are things most Australians already possess – there is no cost associated with torrenting. Unless you're caught and have to pay a fine or face a lawsuit, of course.

Australia's recent governmental IT Pricing Inquiry found that Australian citizens generally pay 50 per cent more than US standard pricing for software, computer hardware, and music. PC and console games were a huge stand-out, with an 84 per cent premium on US pricing. When you look



at the prices that other countries pay for this content, it's clear that in some cases, we're being ripped off. It doesn't go nearly far enough to justify paying nothing and breaking the law, but that's the reasoning of the majority of dedicated BitTorrent pirates.

It's also incredibly convenient. When you download a popular file via BitTorrent, you're almost guaranteed a file that works. Because there's no restrictions or digital rights management (DRM) on the data in most torrents, you can use them anywhere, at any time, on any device you want. Take an episode of Game of Thrones or Breaking Bad, for example – buy it online and you'll be restricted to one or two devices, but pirate it and you can watch it on everything you own – and then give it to a hundred friends. And, on top of this, the crowd-sourced nature of BitTorrent means that high-quality content usually rises to the top, and fakes quickly disappear.

Timeliness is another factor that makes BitTorrent popular. Stuck down in that quiet metaphorical bottom corner of the world that is the Asia-Pacific region, Australia has long been snubbed with international movie and TV releases. Before 2012, it wasn't unheard of for a TV series to premiere here six months after its final episode had been broadcast in the States. It's still true with blockbuster movie releases, and some books as well.

Shows appear on BitTorrent mere hours after their broadcast, and are equally quick to acquire. Even movie recordings can be found in very short time after they hit cinemas. Especially when social media can spoil a huge twist – look at the hype around the recent finale of Breaking Bad – keeping up is only truly possible if you're a pirate.

"We don't have quite the perfect piracy alternative here yet that Netflix and Hulu offer..."

WHAT ALTERNATIVES ARE THERE?

To be fair to the content providers, they've done a great job recently in making popularly pirated content more easily available to consumers.

The last 18 months has seen enormous advances in the availability of online movie, TV and music streaming and download services. The iTunes Store, Spotify, and services like Quickflix make it relatively easy and simple to purchase content, rent it, or pay a single flat fee and access as much as you want.

Also not to be ignored is the fact that DVDs and Blu-rays of both TVs and movies are being released faster than ever after their screen debuts, giving legitimate consumers more opportunity to purchase the titles they want instead of acquiring them illegally.

We don't quite have the perfect piracy alternative here yet that Netflix and Hulu offer in the US. Both services charge their users under US$10 a month, and let them view as many TV shows and movies as they want, and both are dedicated to adding new video regularly. Hulu focuses on next-day or simultaneous TV and movie releases, while Netflix stores a massive library of older content, like an always-open video store.

We're making baby steps towards that ideal situation, though. Foxtel Play offers the cable TV provider's most popular channels and shows for a significantly reduced price compared to a traditional cable subscription, with no lock-in contract and a simple pricing structure that starts at $25 per month. Streaming movie providers like Quickflix may not have the most extensive libraries yet, but they use a single monthly price structure that is definitely the way of the future.

Online distribution for games and software is slowly catching up as well. Services like Valve's lauded Steam client make it incredibly easy, and far more convenient, to buy and download games than it is to pirate them. There's a clear added value in Steam's automatic updates compared to a cracked PC game, too, and the platform's regular sales almost entirely take the squeeze of high prices out of the equation.

ALL THINGS SAID...

At the end of the day, BitTorrent is hugely popular because it's able to offer something that no legitimate competitor has so far. By virtue of its open nature, it has hit that trifecta of speed, convenience and price that draws in so many users.

When it's possible to get a top-quality TV show, in better resolution than it's shown here, within hours of its broadcast 7500 miles away, in a format that you can use anywhere, for precisely zero dollars, there's no denying that downloading via BitTorrent has a lot of things going for it.

Except, y'know, that it's illegal. ■

BACK UP YOUR LIFE

WHEN YOUR DATA IS SPREAD ACROSS PCS, MOBILE DEVICES AND THE INTERNET, BACKING IT ALL UP BECOMES A CHALLENGE. WE REVEAL THE BEST WAYS TO KEEP YOUR DATA SAFE, NO MATTER WHERE YOU STORE IT

Get Physical

If you want to keep your data safe, you should make regular physical backups. Even if you like the idea of storing all your files in the cloud, it's good practice to combine cloud backup with a physical fallback in the shape of hard drives or DVDs. After all, in the event of a data disaster, copying hundreds of gigabytes directly from a disk will be much quicker than downloading them via your internet connection.

BACKUP ESSENTIALS

For small backup jobs, backing up to DVD is a cheap, sensible option. A single-layer DVD holds up to 4.7GB of data, and most backup software will split large backups across multiple disks if you need more storage space. Make sure to use write-once rather than rewritable disks, since these last longer and remove the possibility of copying over existing backups.

When it comes to safeguarding huge collections of music, movies and photographs, opt for an external hard disk or a NAS device. For basic backup purposes, a USB hard disk is the cheapest, most convenient option: a USB 3 model such as the 2TB Western Digital My Passport costs $160.

You can save some cash by repurposing old laptop or desktop disks – a USB 2 or USB 3 disk caddy can turn old drives into useful backup storage. Some caddies are particularly suitable for backup purposes, such as StarTech's USB 3 docking station, which allows you to hot-swap two 2.5in or 3.5in drives as you please: simply slot the bare drives into the base and they will appear as external storage.

CENTRALISED STORAGE

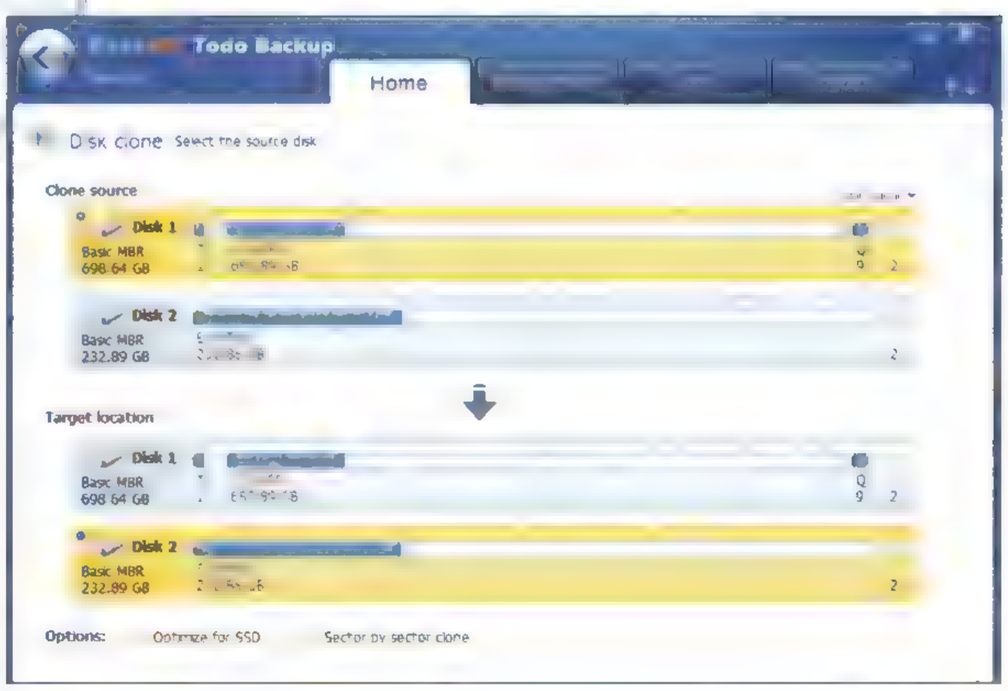
If you're backing up several computers, a NAS device connected to your wireless router is an elegant option: every computer connected to your network will be able to use it to store backups. We'd recommend opting for a two-bay device as a minimum, since this makes it possible to add a layer of data redundancy by configuring the installed drives as a mirrored RAID array. If one of the drives should fail, you can simply replace it with another of the same type, so no data is lost.

Whichever method you choose, make sure your most precious data is backed up in at least two places – we'd recommend storing a backup at a friend or relative's house, just in case. If you're really worried, you can combine on-site and off-site physical backups with any of the cloud services we look at on the opposite page. It sounds like overkill, but even in the event of a flood or house fire, and even if your internet connection goes up the spout, you can be sure you'll have at least one working backup.

If you decide to adopt hard disks or optical discs, make sure you store them in a cool, dry, dark place. Optical discs are susceptible to light and extremes of temperature, and hard drives need to be treated carefully if you want to use them as a long-term backup medium. It's best to hook up backup drives every couple of months – this stops the drive mechanism seizing up, and gives you a chance to check the drive's data integrity.

WHAT SOFTWARE?

There's no need to spend money on dedicated backup software. Windows 7 has a built-in backup client, and while it isn't as nippy or feature-packed as some of the free tools out there, it works fine. The major limitation is that Windows 7 Home Premium doesn't allow backups to be made to a network location, such as a NAS device.



EaseUS Todo Backup Free 6 offers both full and incremental backups

Windows 8 goes one step further. You can still schedule full backups on a daily basis, but the new File History feature keeps track of all the files in your media libraries, allowing you to roll back to previous versions of existing files and recover deleted files.

If you want more control over your backups, there's a raft of good-quality free packages (we've listed a few in the table below). These provide additional features, such as the ability to back up to network locations – regardless of the OS you're running – and the ability to restore individual files or folders, rather than a complete backup. Other options include the ability to create bootable rescue disks in the event of a complete OS meltdown. And if you have Ubuntu or Linux systems running alongside Windows PCs, Redo Backup & Recovery (**www.redobackup.org**) runs directly from a live CD or USB thumbdrive, which allows it to back up both Windows and Linux machines.

"A USB 2 or USB 3 disk caddy can turn old hard disks into useful backup storage"

FREE BACKUP PACKAGES

	Cobian Backup 11 (Gravity)	DriveImage XML	EaseUS Todo Backup Free 6	Macrium Reflect Free	Paragon Backup & Recovery 2013 Free	Redo Backup & Recovery
Web address	www.cobiansoft.com	www.runtime.org/driveimage-xml.htm	www.todo-backup.com	www.macrium.com/reflectfree.aspx	www.paragon-software.com	http://redobackup.org
Back up to a network location	✓	✓	✓	✓	✗	✗
Encryption	✓	✗	✗	✗	✗	✗
Scheduling	✓	✓	✓	✓	✓	✗
Backup types	Full, incremental, differential	Full	Full, incremental	Full	Full, incremental, differential	Full
Bootable rescue disk	✗	✗	✓	✓	✓	Runs from live CD/USB thumbdrive
Disk cloning	✗	✓	✓	✓	✗	✓
Restore individual files/folders	✗	✓	✓	✗	✓	✗

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The voucher is non-transferrable and not redeemable for cash. Keyboards sold separately. Colours vary by market and are subject to availability.

Ahead in the cloud

Not so long ago, backing up gigabytes of data via an internet connection would have been a terrifying prospect. But as our internet connections have become faster and faster, and ADSL has started to give way to affordable fibre broadband, the prospect of storing data in the cloud has gone from a pipe dream to a hassle-free reality.

IN SYNC

There's a dizzying variety of cloud storage and backup services to choose from, but it's important not to confuse the two.

The likes of Dropbox, Google Drive and Microsoft's (soon to be renamed) SkyDrive are online repositories that allow you to synchronise files and folders across multiple devices. They provide a certain level of data protection, in that you can revert to older versions of files and restore undeleted files (albeit within a restricted time period), but they shouldn't be mistaken for true backup services, since there are no built-in automatic backup functions.

However, with a little help from cunning software, you can use a number of these file-synchronisation services as backup storage.

Duplicati (**www.duplicati.com**) is a free client that facilitates this. It can store backups in Google Drive, Amazon S3 and SkyDrive accounts, as well as a variety of other locations, including Rackspace Cloud Files. It's available for OS X, Windows and Linux; it supports 256-bit AES encryption; and it compresses data to make the most of the limited storage space available.

Another option is CrashPlan (**www.crashplan.com**), which provides a free version of its backup service with a clever twist. While you have to pay for storage on CrashPlan's servers, the free version allows you to back up to other PCs or laptops you own, and even to back up over the internet to computers that belong to your friends and family. Combined with regular physical backups performed using one of the free packages on the opposite page, it's all the security that many people need.

CLOUD BACKUP

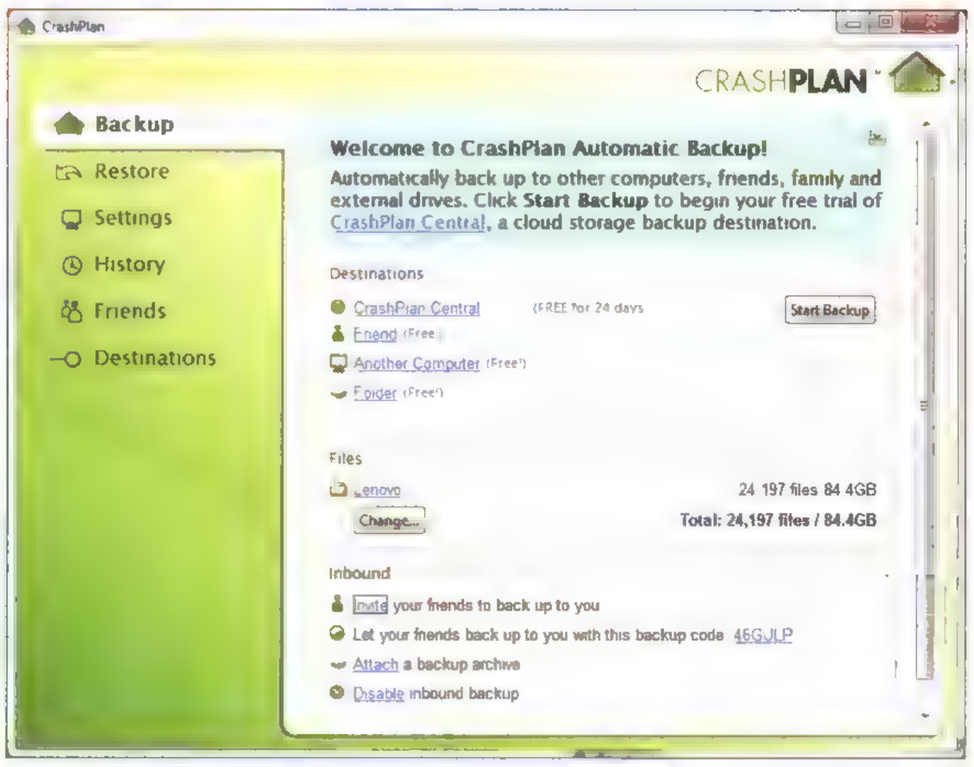
While it may be tempting to make do with the free services we've mentioned – or to rely on physical backups – investing in a cloud backup service offers a range of benefits.

The first is the peace of mind that your data is secure. Co-ordinating a physical backup regime requires a lot of manual effort, and it only needs one or two failed hard drives or scratched DVDs to result in data loss. Doing backup properly can be a mammoth task in the home, and the cost of disks and hard drives can soon add up, too.

In contrast, cloud backup services foot the gargantuan cost of operating multiple servers and data centres; you simply pay a small monthly fee for the privilege of using them. Prices start from as little as $US3 per month, and all the major cloud services offer discounts for long-term subscriptions, if you don't mind committing yourself for a year or more.

Of course, it will take a while to back up hundreds of gigabytes of data over a domestic internet connection, but once the initial backup has been performed, subsequent backups take far less time. As most services use a data compression technique known as de-duplication, the backup clients make sure to upload only unique data that has actually changed since the last full backup was performed.

And, with new and updated files trickling upstream to the cloud constantly, you're far less likely to lose data using this method than in the daily, weekly or monthly gaps that may apply to your physical backup regime.



▲ The free version of CrashPlan allows you to back up to other PCs

There are key features to look out for when choosing a service. The pricier packages generally offer greater amounts of online storage, but some also allow you to back up multiple PCs. If you're hoping to back up several PCs and laptops – for all your family's devices, say – these deals will work out much cheaper than purchasing individual backup accounts for each device.

What's more, many of the cloud backup providers take the very best aspects of cloud storage services and build on them. File versioning means you can reach back in time to download older versions of files that you may have accidentally deleted or altered, but unlike Dropbox, there's no 30-day limit – several of the paid-for services extend this ability forever.

Combine this with the ability to access the contents of your backups via any internet-connected device with a web browser, and the idea of backing up to the cloud begins to look very attractive indeed.

CLOUD BACKUP SERVICES

	Backup Genie	Carbonite	CrashPlan	Mozy	Livedrive	SugarSync
Web address	www.backupgenie.com	www.carbonite.com	www.crashplan.com	http://mozy.com	www.livedrive.com	www.sugarsync.com
Storage options	75GB (1 PC, $US4.49/mth); 250GB (1 PC, $6.95/mth); Unlimited (1 PC, $9.95/mth)	Home (1 PC, unlimited, $US60/yr); Home Plus (1 PC, unlimited, $US100/yr); Home Premier (1 PC, unlimited, $1US50/yr)	10GB (1PC, $US2.99/mth, 32.99/yr); Unlimited (1 PC, $US5.99/mth, 59.99/yr); Family Unlimited (up to 10 PCs, $US13.99/mth, 149.99/yr)	50GB (1 PC, $US5.99/mth); 125GB (3 PCs, $US9.95/mth)	Backup (1 PC, unlimited, $US6/mth); Pro (5 PCs, unlimited plus 5TB cloud storage and syncing between computers, $US12/mth)	5GB (free); 60GB ($JS7/mth, $US75/yr); 100GB ($US10/mth, $100/yr); 250GB ($US25/mth, $US250/yr)
File encryption	256-bit	128-bit	448-bit	448-bit	256 bit	256-bit
Access files from web browser	✓	✓	✓	✓	✓	✓

Back up Android

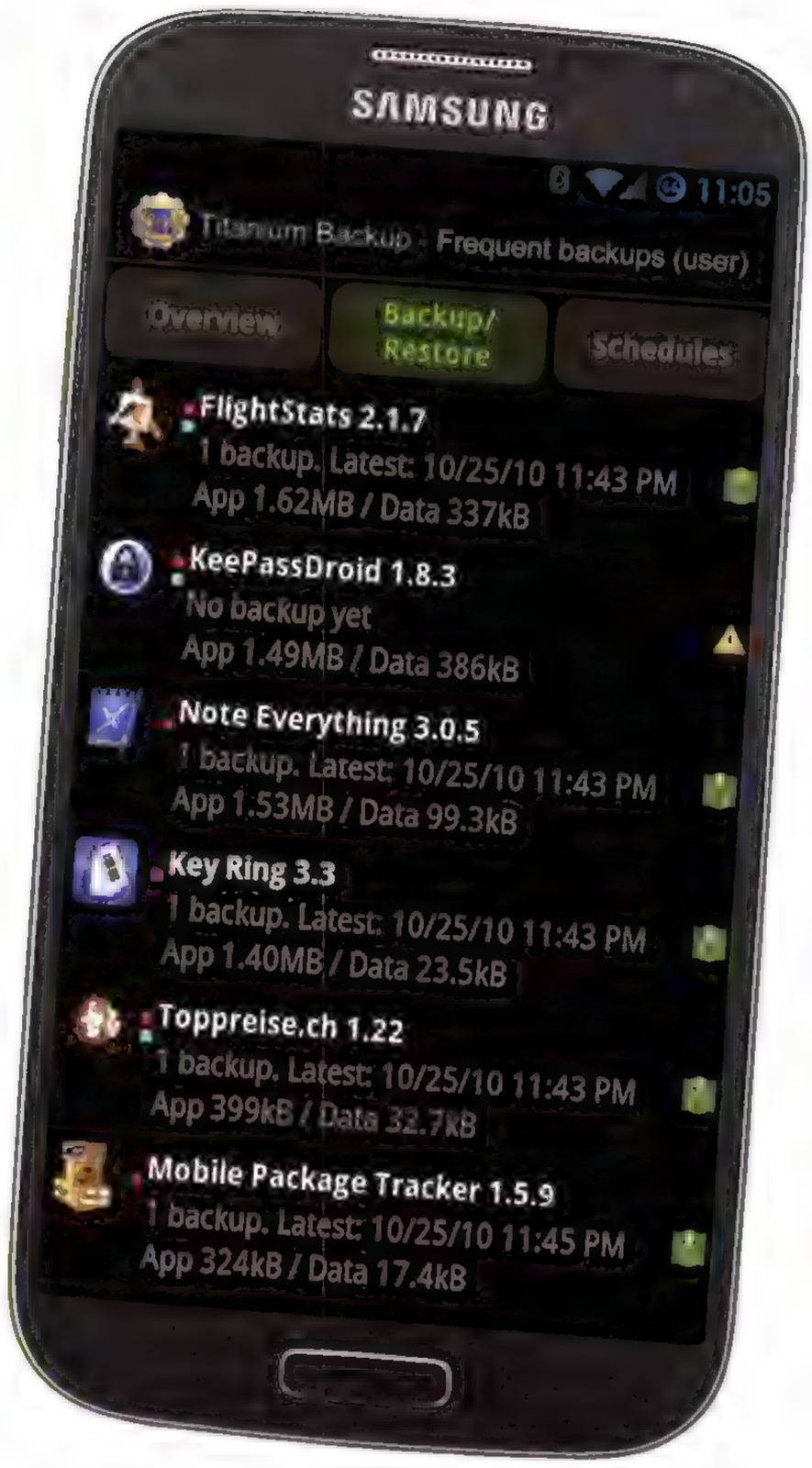
Android devices incorporate a lightweight cloud backup service called Google Backup that's similar in principle to Apple's iCloud; you can check it's enabled by going into Settings | Backup to reset and ensure all the options are ticked. Various settings and personal items are periodically backed up to Google's servers and tied to your Google account – that is, the identity you use to access Google Play, Gmail and other services. If you need to wipe your device, or migrate to a new one, you'll be given the option at startup to restore your data from this account to help you hit the ground running.

It doesn't back up as much as iCloud, however. It keeps a record of contacts, and various settings such as Wi-Fi passphrases, but it doesn't stretch much beyond that. This fits in with Google's big idea that Android users' data will live in the cloud, via services such as Google Drive, Google Music and Picasa. Applications aren't backed up directly, either, but they're automatically re-downloaded if you log in to Google Play from a just-restored device.

In practice, this means you'll need a separate backup plan if you're using your Android phone or tablet to store personal files such as music and videos that you've copied onto the device (or created yourself).

Fortunately, there are dozens of Android clients that can back up to local storage or the cloud. One popular free option is Helium – available on Google Play – which allows you to back up apps and personal data on demand. If you pay $US5 for the ad-free Premium version, you can also back up your files to a cloud storage service such as Dropbox or Google Drive. Scheduled backups are promised soon, too.

"Root-specific backup apps offer features such as backing up application installers"



Titanium Backup – which works with rooted phones – backs up apps while they're running

Users with rooted phones can gain access to more sophisticated backup features

Those of a technical bent may want to look at some of the more sophisticated Android backup systems out there, those that require a "rooted" phone – that is, one that's been hacked to compromise the standard security measures of the operating system.

If you don't know how to root your phone, it's probably best to leave well alone, but root-specific backup apps such as Titanium Backup offer more advanced features than non-root tools, including backing up application installers and their local data files, backing up apps while they're running, and correctly handling multi-user devices.

You can also use such tools to restore apps selectively and remove or "freeze" unwanted system apps, such as those preinstalled by pushy manufacturers.

Although Google doesn't officially support the tools for gaining root access, root backup apps are freely available via Google Play, so it's worth having a browse to see what suits your needs.

Back up iPhone

Keeping your iPad or iPhone safely backed up is easy: the features you need are built directly into the operating system. However, it may not be immediately obvious how it all works, since Apple gives you two approaches to choose from – iCloud and iTunes.

The most popular option is iCloud. The service runs automatically in the background – you can check it's active by going to Settings | iCloud | Backup & Storage on your iOS device – and backs up your data and media to Apple's servers every day, as long as your device is plugged in and connected to a wireless network. There is unlimited storage for items purchased via iTunes, and 5GB on top of that for personal files such as photos, settings and ringtones. Extra storage –up to 50GB per year – can be purchased via Apple's website.

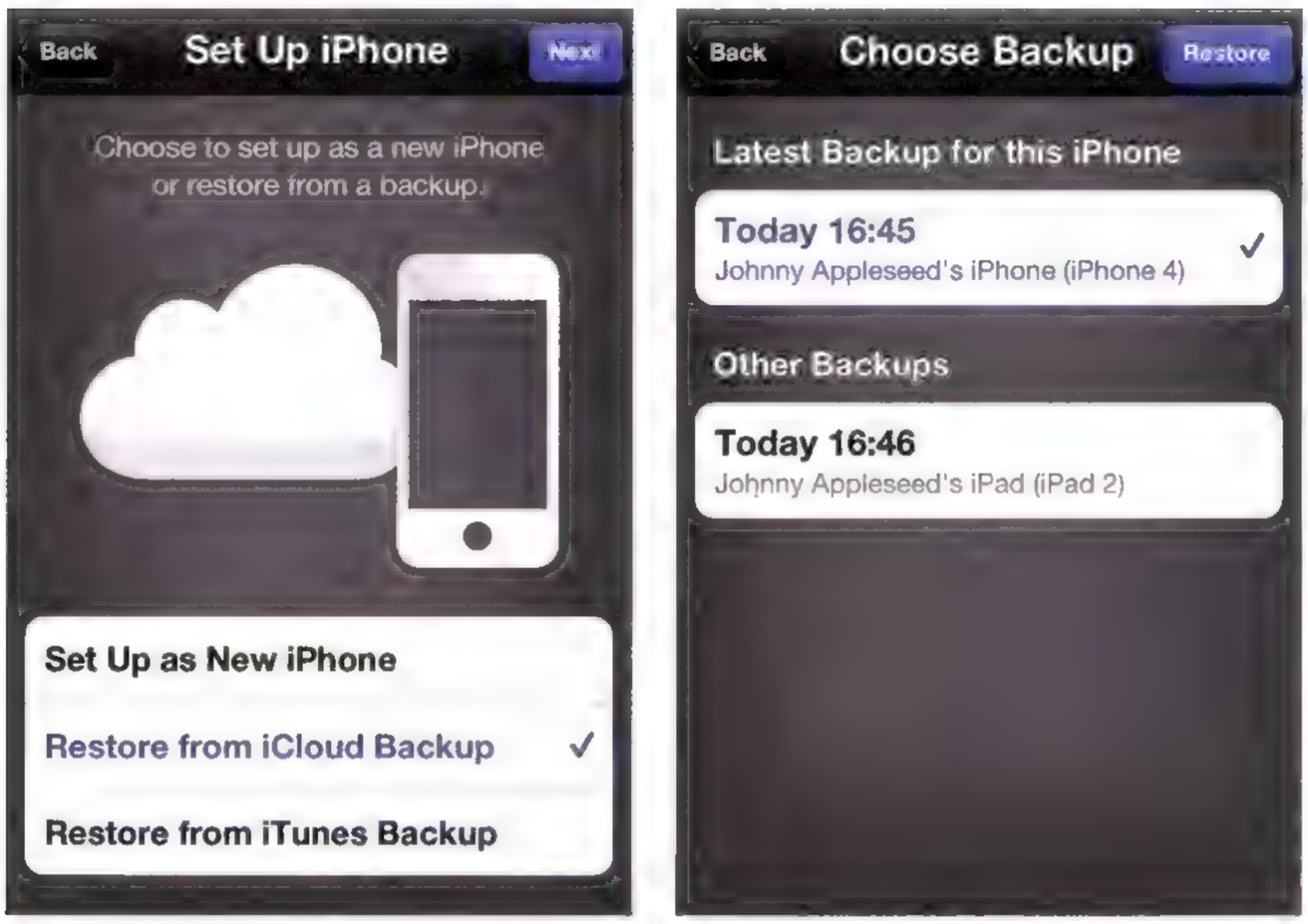
Since iCloud backs up your entire system, restoring from a backup is an all-or-nothing process. Even if you only want to restore your old Camera Roll pictures, you have to roll back your entire device to an earlier state; contacts, messages and all. As if to make this point crystal clear, the command to restore your device from an iCloud backup is found under Settings | General | Reset | Erase All Content And Settings.

You'll also be given the option to restore an iCloud backup when you first set up a new iOS device. In this case, your media and settings will be copied automatically to the new device, and iOS will try to reinstall the same applications that were on your previous device.

iTunes takes a more traditional approach: your settings and personal data are backed up locally into a monolithic archive on your PC. iTunes backup doesn't run automatically, but you can create a backup whenever you like by connecting your iOS device to your computer, right-clicking on its icon in iTunes and selecting Back Up from the menu (alternatively, you can launch the backup from the File menu). You can check the backup status of a device in iTunes by opening the Preferences window and checking its details in the Devices tab.

Unlike iCloud, iTunes doesn't back up media files that are already synced with your computer, such as music and video files. So be warned: if you accidentally wipe these files, an iTunes backup won't bring them back. However, iTunes does have advantages over iCloud. The 5GB limit doesn't apply, so you needn't worry about running out of space.

It's also possible to selectively extract content from iTunes backup files. Apple doesn't support this directly, but third-party tools, such as iPhone Backup Extractor (**www.iphonebackupextractor.com**) and the similarly named iBackup Extractor can do the job. Alternatively, you can eschew iTunes and use a third-party backup client that supports selective restoration: two free options are Lookout and PhoneCopy.



▲ Apple allows iOS users to back up and restore personal data via iCloud or iTunes

Back up Windows

Much like Android, Windows Phone incorporates a backup service – linked to your SkyDrive account – that keeps copies of your account details and settings, and remembers which apps you have installed. Most personal files aren't backed up, but you can customise exactly what's stored by going to Settings | Backup. Windows Phone updates your backups periodically when it's connected to Wi-Fi; if you go a week without connecting, it will save a backup using your mobile data connection.

These backups are intended to be used when you set up a new device, or restore one to factory settings. To revert to a backed-up state, you need to perform a factory reset (Settings | About | Reset Your Phone); you'll then be invited to sign in with your Microsoft account and select the backup you want.

If you want a more comprehensive backup, there's no direct equivalent to the iTunes or Titanium Backup approaches, but you can synchronise all the data on your phone with a desktop PC by installing the Windows Phone app for desktop. This creates a safe local copy of your files, should some disaster befall your phone. For extra security, the files can be included in your regular PC backup regime.

▶ Windows Phone features an Android-style backup service linked to SkyDrive

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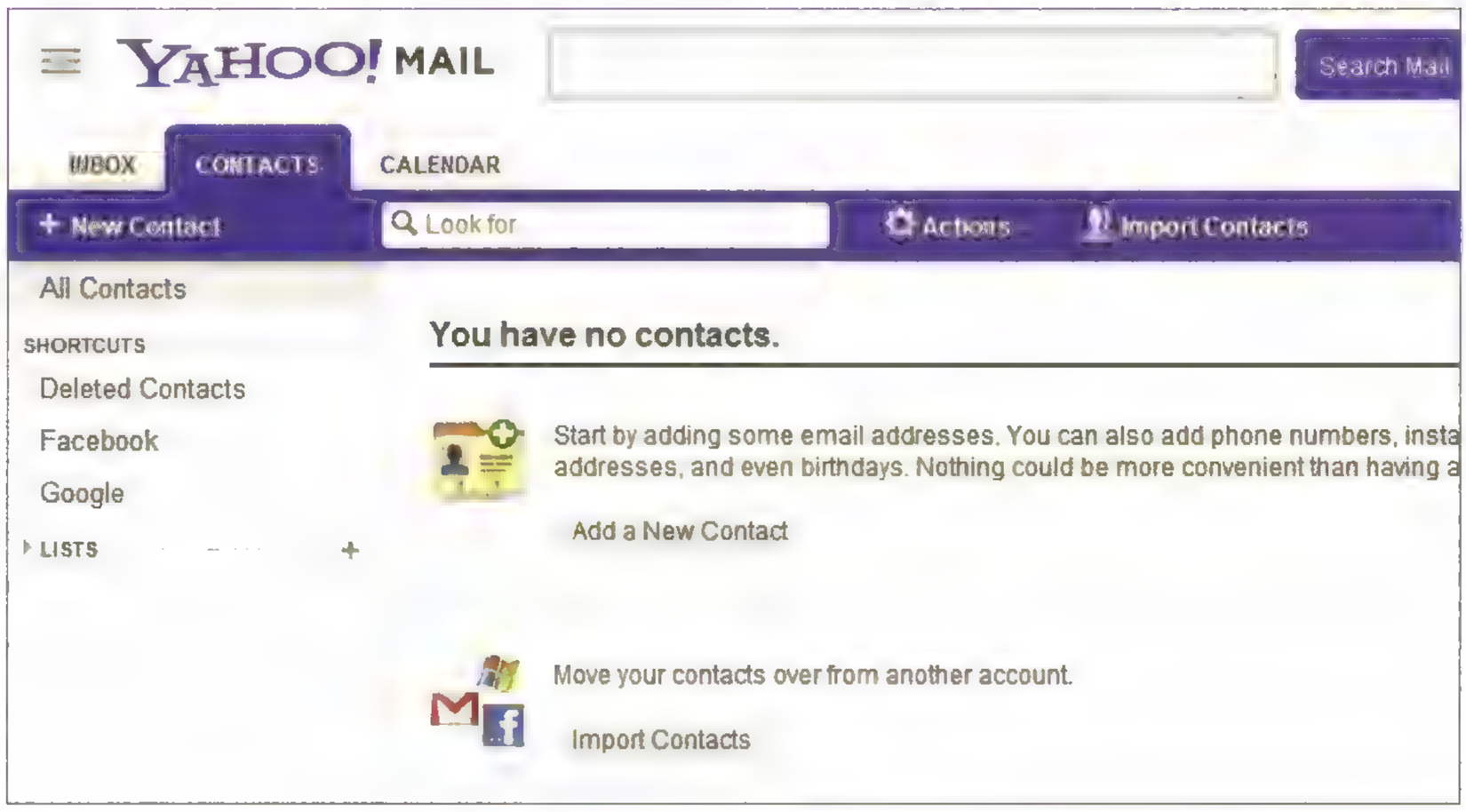
Back up your online life

It may seem unnecessary to back up your social networking and other online data – after all, Google's servers are probably fairly dependable. However, there's a host of ways in which you could lose access to an account: hackers could take it over; you could be locked out by the web company (as has happened to some Gmail users over alleged violations of terms); or your connection could go down, leaving you without key information.

If you depend on your online contacts or don't want to risk losing cherished photos, you need to back them up, just as you would the data on your PC. Here's how to do it.



FACEBOOK AND SOCIAL NETWORKS

Following a European lawsuit, Facebook is required to offer users a way to see what data the site holds on them. As a result, you can now easily download all the messages, photos and videos you've ever uploaded to the site. Simply go to Account Settings; at the bottom of the page, there's a link to download your data. It takes Facebook time to gather it all up, but when it's done, a link is sent to your email inbox. Aside from your uploaded data, the file also includes all the ads on which you've clicked, the IP addresses from where you've logged in and more information besides.

While it includes a list of friends, it doesn't include their contact details – although, rather frighteningly, it does include email addresses it has imported from other websites (such as when it asks whether you want to add contacts from Hotmail).

You can also use Facebook to get a list of your friends' email addresses, but you'll need to use another service to do so. Open a new Yahoo account, go to Contacts and click Import; choose Facebook, then Yahoo will ask to connect to your account and pull in any of your contacts with a public email – for us, it was about half our contacts. You can then export this data into a CSV file.

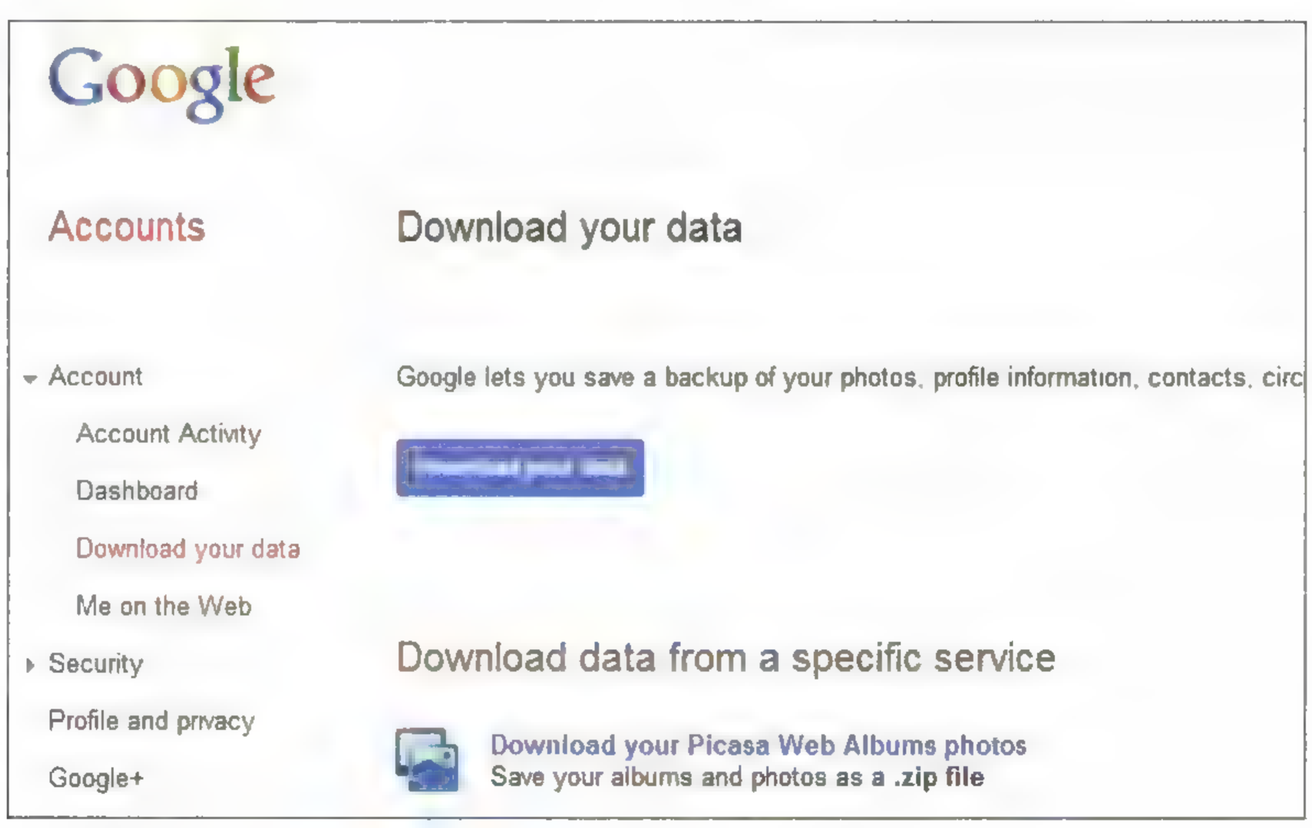
There are also apps, such as UberSync Facebook Contact Sync for Android, that let you synchronise your Facebook contacts with your handset contacts. Facebook doesn't let you grab phone numbers, however.

▲ You can use a Yahoo account to export a list of your Facebook friends' email addresses

Twitter also allows account information to be downloaded. Go to Settings, scroll to the bottom of the page, then click "Request your archive". Like Facebook, Twitter takes time to gather the data – it also sends a link to your email inbox. The zip archive has a browser-based interface to ease navigation, and all the data is also held in a CSV file, so you can open it in Excel.

"You can download all the messages, photos and videos you've uploaded to Facebook"

LinkedIn is perhaps the best social network for allowing you to export your contacts. On your profile page, click Contacts under the Network menu. At the bottom of the page, click Export Connections, and LinkedIn will let you choose your preferred output format (CSV or vCard), complete with names, email addresses, job titles and more.



◀ Google lets users download all personal data stored with its services

GOOGLE TAKEOUT

Google Takeout (**www.google.com/takeout**) gives you access to any Google service via a single dashboard. It lets you download all the data held across its services, or pick and choose from Google+, Blogger and more.

With Google Drive, you can choose

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to download all your files or a single folder, and you can specify the export format too; for documents, you can choose whether to receive it as an RTF file, in Word or open document format, or as plain text or a PDF. Your contacts can be exported in CSV, HTML or vCard formats, and you can even download saved conversations from Google Voice or Hangouts.

WEBMAIL

Gmail, Yahoo and Outlook.com contacts can be exported easily, so you can save a copy of your email lists to your own computer.

In Outlook.com, click the arrow next to the Outlook icon in the top-left-hand side of the screen. A menu will drop down; select People, then click Manage And Export. This will create a CSV file with all the data fields in a contact profile.

In Yahoo, click on Contacts, Actions and Export All. You can choose from files compatible with Outlook or Thunderbird, a CSV file, or a zip file of vCards.

In Gmail, go to Contacts, click More and then Export. You can choose which contacts to export, and whether to get the data in a vCard or a CSV supported by Google or Outlook.

If you want your messages as well as your contacts, the simple way is to use an email client to regularly download your content – or automatically forward everything to another email address.

PHOTO SITES

You might use Flickr's generous 1TB of free storage to back up your photos, but getting the data back isn't as simple as it might seem – the image site doesn't let you download more than one picture at a time. However, it supports third-party apps (**www.flickr.com/services**) – paid and free – that make it much easier to get your photos back.

Flick and Share (**www.flickandshare.com**), for example, lets you download all the photos from a single set – so, if you want all your photos, create a new set and move everything into that. Bulkr (**http://clipyourphotos.com/bulkr**) lets you back up videos and photos from Flickr to your PC, while PhotoSync (**http://webecoz.com**) keeps your Flickr and computer picture folders synchronised, so any new photos you upload are downloaded to your PC automatically.

Instagram and 500px have similar restrictions to Flickr. Both allow individual photo downloads, but it's easier to find third-party apps to download your pictures in one batch. Instaport (**http://instaport.me**), a free web app that downloads your photos to your PC as a zip file, is an option for Instagram users; for 500px, there's Export for 500px Pro or PhotoGet for 500px Pro, both of which are iOS-only.

If This Then That (**https://ifttt.com**) is an easy way to automate photo backups. The site lets you create "recipes" so that, for example, if you upload a photo to Facebook or Flickr it will automatically save the image to Dropbox.

If This Then That lets you automatically back up photos

> **"Frostbox lets you back up your data from Twitter, Flickr, Gmail and others"**

AUTOMATED APPS

If downloading your own data manually seems too much trouble, don't worry: there's an app for that. Free app Frostbox lets you back up your data from Twitter, Flickr, Gmail and others, including Foursquare, Evernote and Tumblr. In Facebook, it grabs not only the photos you've uploaded, but also those in which you've been tagged, in case your friend deletes them. While Frostbox archives from all the services, there's no way – yet – to bulk-export the data. It works with Windows XP, Vista and 7, as well as OS X.

SocialSafe (**http://socialsafe.net**) is a similar service, but rather than backing up to the cloud, it lets you save directly to your own PC. It covers ten networks, from Instagram to Pinterest. Unlike Frostbox, it isn't free: prices start from £5 per year for four social media accounts.

For businesses, there's Backupify (**www.backupify.com**), which automatically backs up Google Apps and Salesforce for a fee – prices start at $US3 per month – or "personal services" such as Facebook, Twitter and Google for free.

Data can be backed up daily, and saved to a PC or the cloud. ■

Frostbox lets users back up data from myriad social networks, from Facebook to Foursquare

IN THE LABS

YOU WON'T FIND BETTER REVIEWS ANYWHERE IN AUSTRALIA!

A confession

DAVID HOLLINGWORTH ADMITS TO BEING KINDA LOW-TECH WHEN IT COMES TO HOME-NETWORKING

So I'm not too proud to admit this: despite having a relatively stable home network, and devices all over the shop, I still rely on a good old sneakernet to move stuff around the home.

Ah, the sneakernet. Odd that we consider that a kind of low-tech option, but you just can't fault the reliability and bandwidth of a USB stick for getting data around the house. I'll download something onto my PC, copy it to stick, then move it downstairs. Sure, I don't wear sneakers as a rule, but... sneakernet.

Part of it's because, as part of my job, I get a tonne of USB sticks. Most press materials are distributed via this method, so I almost have more 4 and 8GB sticks than I know what to do with. A pile of a dozen or so sticks sits by my PC, then slowly migrates to the television or other points around the house, then back again.

Wi-Fi can be a little dodgy in my apartment because, I think, there are just so many wireless networks in the building, plus there's always a laptop, and any number of phones and tablets, connecting to it. And for watching HD files, Wi-Fi can be a little stuttery, and I'm funny about that kind of thing. My apartment's a weird split-level number, so running wiring is a little impractical, and while I do have some powerline gear, it is, again, not quite up to task on pushing HD media.

Getting stutter during the climax of your favourite film is... ugh.

And really, with a 5.1 AV setup, a couple of consoles, a media player, attached storage... gosh. I have more than enough cabling running around the lounge room as it is.

And that's the odd thing about resorting to running around the house with USB sticks. In a lot of ways it's just easier. I know I could put in the effort to get the network 'just so', but...

What would I do then with all those damned sticks?!

DAVID HOLLINGWORTH is our Managing Editor. In between reviewing games and hardware, he looks after *PC & Tech Authority*'s website and social feeds

WHAT OUR A-LIST MEANS

Our A-List award is reserved for the best products in each category we review. With a winner and an alternative pick in each, that's 92 products you know are first class.

WHAT OUR AWARDS MEAN

PC & Tech Authority's comprehensive Real World testing sorts out the best products from the pack. Any product recommended by *PC & Tech Authority* is well above average for features, value for money and performance.

WHAT OUR RATINGS MEAN

★★★★★★	OUTSTANDING
★★★★★	VERY GOOD
★★★★	GOOD
★★★	ORDINARY
★★	POOR
★	VERY POOR

HOW WE TEST

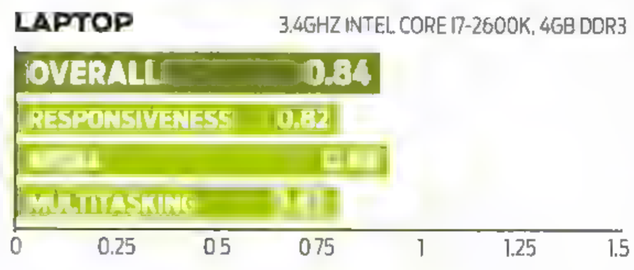
OUR BENCHMARKING TESTS ARE THE BEST IN THE BUSINESS. READ ON TO FIND HOW THEY WORK...

2D TESTS

We test desktop PCs, netbooks and laptops with our own, custom-built, 2011 Real World Benchmarks.

We split the results into three categories: Responsiveness, Media and Multitasking, with the Overall score an average of the three sub-scores.

For instance, responsiveness replicates light browser and productivity workloads. The Media test involves running iTunes for audio conversion, Photoshop CS5 to crunch large images and Sony Vegas 10 to edit home video. This then gets run simultaneously alongside Cinebench 11 in order to get a handle on the multitasking ability of the system.



3D TESTS

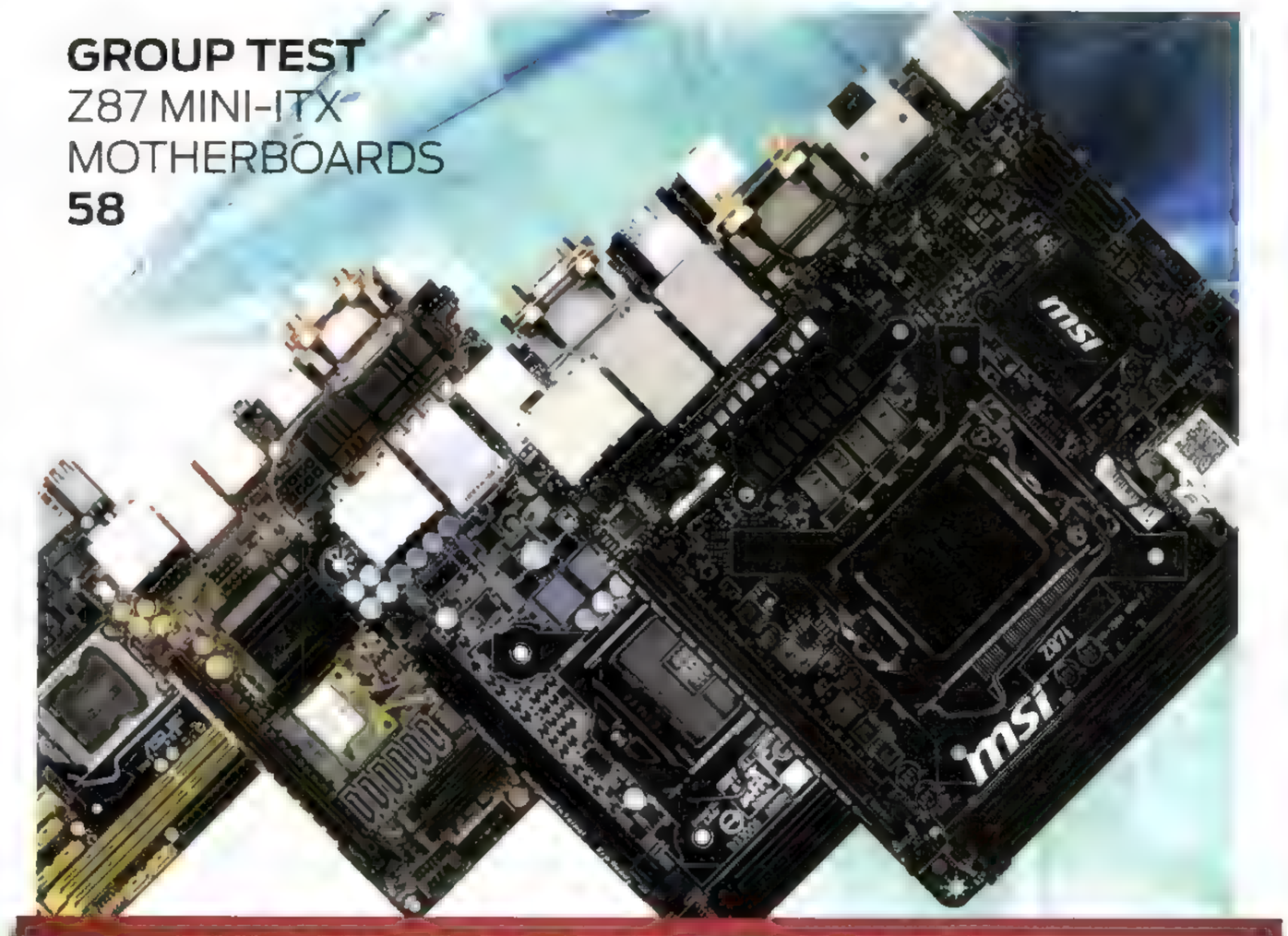
We use pre-recorded demos in Crysis and DIRT 3 to test gaming performance where relevant. We have three standard test settings, depending on the power of the graphics card: Low, Medium and High.

To test gaming performance, we use our own recorded Crysis benchmark. We use the Low, Medium and High quality settings in 1366 x 768, 1600 x 900 and 1920 x 1080 screen modes respectively. Very high-end systems can also be tested using the ultra-intensive Very High settings, with all detail switched on, and varying levels of anti-aliasing enabled.

LAPTOP BATTERY LIFE

We subject laptops to two battery tests. In the light-use test, we optimise the system settings for the greatest power efficiency. We then disconnect the mains and run a script scrolling a selection of web pages until the system shuts down, giving you a realistic idea of the surfing time each laptop offers.

For the heavy-use test, we engage Windows' High Performance power profile, set the display brightness to maximum, and allow the taxing Cinebench 3D renderer to push the processor load to the limit. This gives a worst-case figure, revealing how long you can expect the battery to last under the most demanding conditions.



GROUP TEST
Z87 MINI-ITX MOTHERBOARDS
58

REVIEWED THIS ISSUE...

HANDHELDS

iPhone 5s 44
iPhone 5c 44
Nokia Lumia 1020 47
Samsung Galaxy Note 3 51

PERIPHERALS

ASUS PQ321QE 50
Leap Motion 52
Plantronics RIG 52
Tesoro Colada 54
Ozone Rage 7HX 54
Microsoft Sculpt Comfort Mouse 54

SOFTWARE

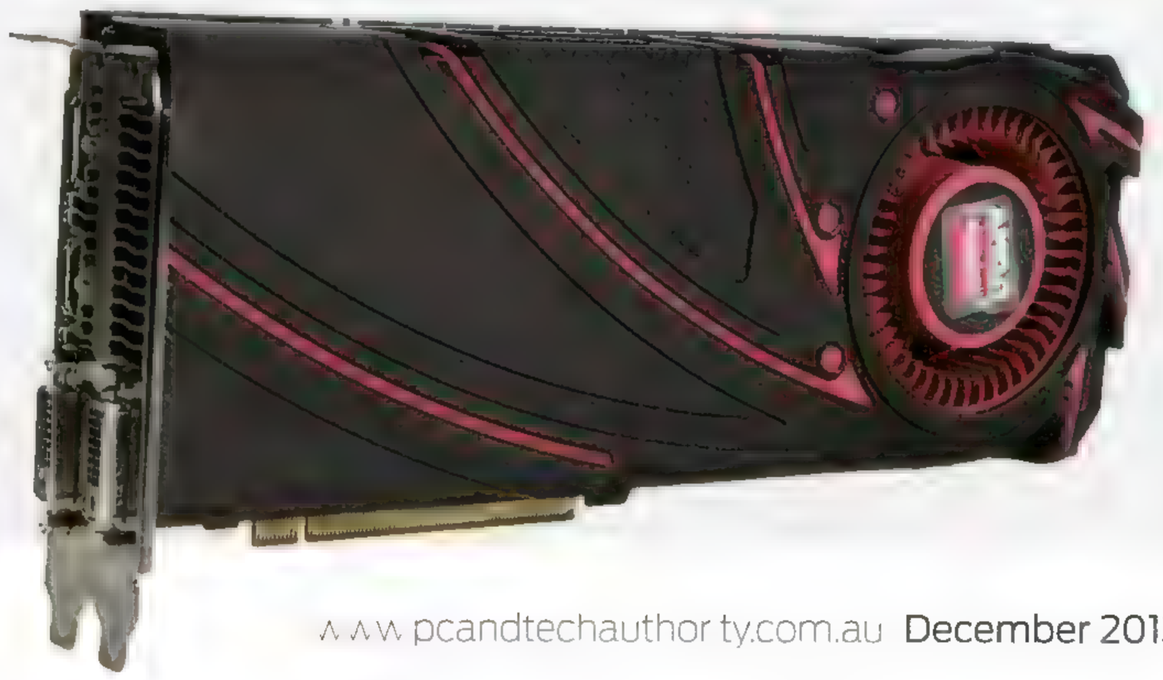
Omny 56
Mercury Browser 56
Runtastic Six Pack 57
Launch Center Pro 57
Yahoo Mail 57
Slowcam 57

COMPONENTS

AMD Radeon R9 290X preview ... 48
Corsair Air 540 53
Fractal Design 1000W Newton 54
ASUS Radeon R9 280X DCUII TOP 55
XFX Radeon R9 280X Black OC Edition 55
Gigabyte R928XOC 55
Gigabyte R927XOC 55
Asus Maximus VI Impact 61
Asus Z87i-Pro 62
ASRock Z87E-ITX 64
Gigabyte GA-Z87N-WiFi 65
MSI Z87i 66

GAMES

Xbox One preview 69
The Wolf Among Us 71
Grand Theft Auto V 72
War of the Vikings 75
F1 2013 76



Photography: Intro, Danny Byrd; cutouts: Julian Velasquez; repro, Jan Elnak

APPLE IPHONE 5S VS 5C

THE NEW IPHONES MAY LOOK SIMILAR, BUT FOR APPLE DEVOTEES LOOKING TO UPGRADE, THE CHOICE IS SIMPLE – BUY THE 5S, NOT THE 5C

PRICE iPhone 5s from $869, 5c from $739
SUPPLIER www.apple.com.au

Apple stepped out of its comfort zone when it launched the 5c alongside the 5s in September. It was the first time the company had debuted more than one smartphone at an event, putting iPhone owners in a quandary.

In years gone by, there were two questions when it came to forking out for an iPhone: when to upgrade, and how much storage to opt for. Now there's another decision to make: which model should you buy?

DESIGN

At first glance, the new iPhones look dramatically different – while the 5c is hewn from brightly coloured polycarbonate, the 5s comes in three stylish, understated metal finishes. In the hand, though, they're both unmistakably iPhones. Apple's decision to stick with 4in screens means both phones remain among the most pocketable smartphones on the market, and the ports, switches, buttons and speaker grilles sit in familiar locations. The dimensions are similar to the previous version, too. In fact, the 5s and 5c are separated only by a millimetre or so all round, with the biggest differences being weight and thickness: the 5c is 1.4mm thicker than the 5s, and 20g heavier.

In terms of feel, however, the two couldn't be more different. The 5c's plastic case feels sturdy and well constructed – thanks to a steel endoskeleton – but it doesn't ooze the same high-end charm as the 5s, which carries the gleaming aluminium chassis of its predecessor. With the 5s adding a "space gray" colour to the mix, and a surprisingly tasteful gold version, it's in a different class entirely.

TOUCH ID AND DISPLAY

The most interesting difference between the two handsets is the iPhone 5s' fingerprint sensor, which is built into the home button. Used to unlock the phone and authorise iTunes purchases, it's a far cry from the unreliable swipe sensors we've seen built into business laptops over the years.

Once you've registered a thumb or finger with the phone, it's a simple matter of resting the digit on the button to unlock the phone or authorise a purchase in place of a password. It works reliably and is genuinely convenient.

The screen, however, is the same on both handsets, and in terms of quality, it still holds its own. It's a 4in, 640 x 1136, IPS display with a pixel density of 326ppi and a maximum brightness in excess of 500cd/m2, which makes both phones readable in all but the most extreme conditions.

Whether or not 4in is big enough in this day and age is another question entirely. Next to rivals from HTC and Samsung, both handsets look tiny, and for some jobs – browsing the web and typing long text messages, for instance – both feel cramped.

IPHONE 5S

Dual-core 1.6GHz Apple A7 64-bit CPU · 1GB RAM · 16/32/64GB storage · 4in 640 x 1136 IPS display · GSM/WCDMA/3G/HSDPA/4G · dual-band 802.11abgn Wi-Fi · 8MP/1.2MP rear/front cameras with 1080p/720p video · Touch ID fingerprint reader · 1560mAh battery · iOS 7 · 1yr RTB warranty · 124 x 7.6 x 58.6mm (WDH) · 112g

▲ The 5s, with its luxurious aluminium chassis, is in a different class of design from the 5c. It also boasts the useful Touch ID sensor

▲ The 5c is cheaper than the 5s, and available in five colours

CAMERAS

On paper, there isn't much to separate the cameras, either: both phones feature an 8-megapixel rear camera and a 1.2-megapixel snapper on the front. It's only by looking at the specifications, and comparing the images, that you begin to notice the differences.

The iPhone 5s' rear camera has a 15% larger sensor than that of the 5c, and a wider aperture – f/2.2 compared to f/2.4. This suggests superior light-gathering capability, and should lead to cleaner snaps in low light. The 5s also has an improved flash, dubbed True Tone, which uses a secondary, coloured LED, ostensibly to produce more balanced indoor photos.

In our tests, we found the 5s captured more detail with lower noise in low light than the 5c, and images generally looked sharper as a result. The flash produced more natural-looking images and retained skin tones, too, whereas the 5c's single-LED flash washed out faces significantly.

On the video front, the 5s has "improved" stabilisation over the 5c; the difference is there, but it isn't very noticeable. There's also a fun slow-motion video mode – which harnesses the 5s' ability to record 720p video at 120fps – and a fast burst mode that can take ten photos per second.

The 5s' camera is clearly the superior all-round snapper, with more features and better performance in low light than the 5c's.

iOS 7: KEY NEW FEATURES

iOS 7 introduces several new features to the new iPhones and some older handsets:

- AirDrop – Wirelessly share photos, videos or other files with nearby iOS devices.
- Control Centre – One-swipe access to key controls, such as music playback, screen brightness and screen orientation.
- Notification Centre – Revamped to focus on key data, such as upcoming appointments.
- FaceTime Audio – Make voice-only calls to FaceTime contacts when bandwidth is limited.
- Spotlight search – Now hidden behind an awkward drag-down gesture, search has been revamped.
- Photo Collections – Snaps are now automatically organised into date- or location-themed photo albums.

IPHONE 5C

Dual-core 1.3GHz Apple A6 CPU · 1GB RAM · 16/32GB storage · 4in 640 x 1136 IPS display · GSM/WCDMA/3G/HSDPA/4G · dual-band 802.11abgn Wi-Fi · 8MP/1.2MP rear/front cameras with 1080p/720p video · 1510mAh battery · iOS 7 · 1yr RTB warranty · 59 x 9 x 125mm (WDH) · 132g

PERFORMANCE AND BATTERY LIFE

Under the hood, the two handsets are fundamentally different. Both handsets have 1GB of RAM, but while the 5c employs the same core hardware as the iPhone 5 – a 32-bit 1.3GHz dual-core Apple A6 CPU – the 5s features a faster, 64-bit processor, the dual-core 1.6GHz Apple A7.

It isn't yet clear what benefit 64-bit can bring to a device with only 1GB of RAM, but it's obvious from our tests that the Apple A7 is a monster. In the SunSpider browser test, it finished with an average time of 404ms; the 5c completed it in 718ms. In the Geekbench 2 CPU test, it attained a

The 5s' 64-bit CPU blows away the 5c in terms of performance

score of 2246 versus the 5c's 1645. In the GFXBench T-Rex HD gaming test, it returned a stunning result of 37fps, compared to the 5c's 13fps.

No other smartphone we've tested can match the 5s' all-round level of performance; only the Samsung Galaxy S4 (web ID: 381229) gets close, with a faster score in Geekbench, but slower scores elsewhere. But what's even more impressive is that all this extra juice doesn't cost battery life. In our 24-hour test, in which we perform a selection of core tasks (screen on for an hour, a 50MB data download over 3G, a phone call of 30 minutes and audio playback) then leave phones syncing in standby, both handsets retained 60% capacity after 24 hours.

VERDICT

Not much else is different. Both phones run iOS 7 by default – which has its detractors, but works fine on each. Both support all current 4G bands, and neither features NFC or 802.11ac Wi-Fi.

However, it should be clear by now that there's only one handset in the running when it comes to winning this particular race – it's the 5s, and by several lengths. It's lighter, faster, more desirable, has a better camera, and is considerably more innovative than its plastic-coated cousin.

It's still an expensive handset, and arguably offers less value for money than our A-Listed HTC One, but next to the 5c – which is only $130 cheaper SIM-free – it's an easy choice.

If you're in the market for a new iPhone now and are uncertain about which way to go, the answer has to be to opt for the iPhone 5s. In two years' time, when you're installing iOS 8, you'll almost certainly regret it if you don't.

Jonathan Bray

IPHONE 5S

IPHONE 5C

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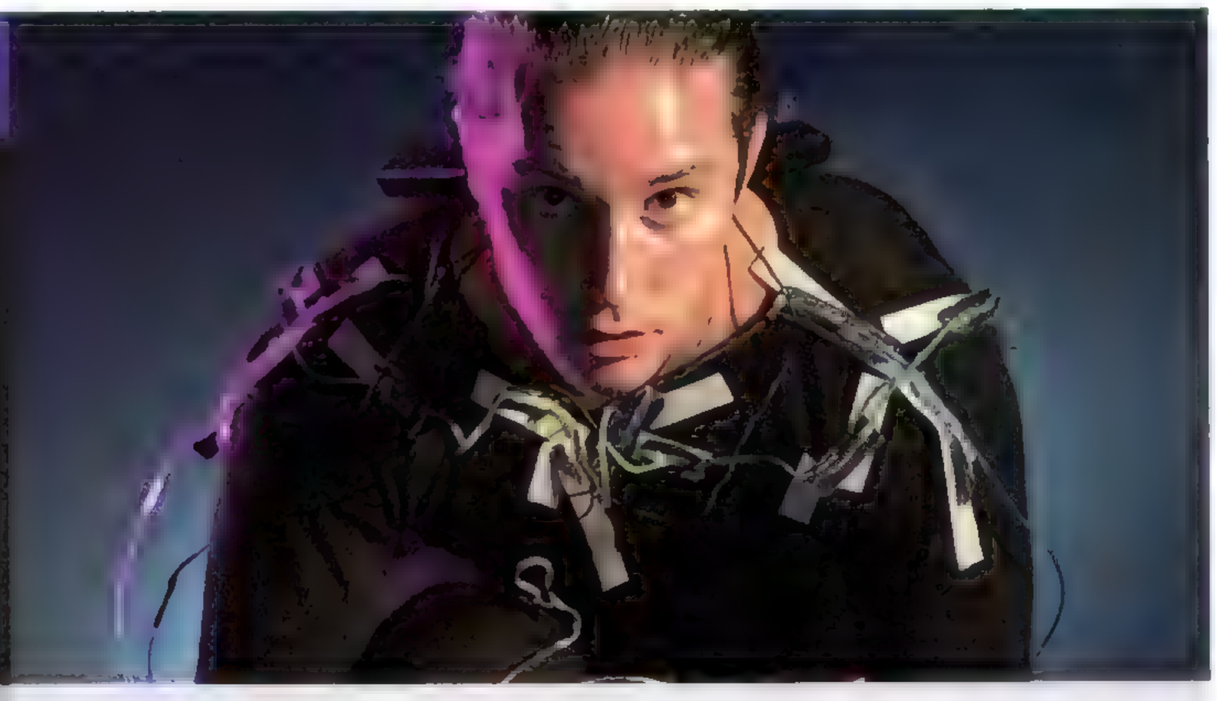

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NOKIA LUMIA 1020

A SUPERB CAMERA AND A COMPETENT SMARTPHONE – THE BEST WINDOWS PHONE 8 HANDSET YET

PRICE $820
SUPPLIER www.nokia.com.au

It's been a long time coming, but Nokia has finally got around to including the 41-megapixel sensor technology from the 808 PureView in a smartphone worthy of the name. And after a frustrating two-month wait, the Lumia 1020 has finally arrived in the Australia.

Design-wise, it's the natural successor to the Lumia 920. Just like that handset, it's constructed from a single block of high-quality plastic, with gently curved sides and squared-off ends. As you'd expect from a flagship Nokia handset, it feels fantastic in the hand – the silky, matte finish is a cut above most smartphones. We love the bright yellow of our review sample, too, although it's also available in white and black.

While the chunky camera unit swells the 1020's body, it isn't outrageously bulky: it weighs 158g, which although heavy when compared to the 130g Samsung Galaxy S4 and Apple's iPhone 5s (see p44), is 26g lighter than the 920.

Aside from losing the wireless charging feature, nothing's missing from the specifications list. There's a 4.5in, 768 x 1280, OLED display with a Gorilla Glass front, a 1.5GHz dual-core Qualcomm Snapdragon S4 CPU, 2GB of RAM, and 4G compatibility.

However, if you're interested in the 1020, it won't be for the design – it's all about the snapper on the back. The 1020 uses a 2/3in, backside-illuminated, 41-megapixel sensor to produce 34-megapixel images at an aspect ratio of 16:9, or 38-megapixel photos at 4:3. It has a Carl Zeiss-branded f/2.2 lens; a shutter speed range of 1/4,000s to 4s; an ISO range of 100 to 4000; and the ability to adjust the focus and the white balance, and set exposure compensation between -3 and +3EV in 1/3 stop steps.

All the settings can be adjusted manually via the intuitive, dial-based interface of Nokia's Pro Camera app. This delivers the sort of control normally associated with enthusiast compact cameras and DSLRs, such as the ability to limit noise by keeping the ISO low, or to freeze fast action by setting the shutter speed high. There's also an optional camera grip, costing $89, which snaps onto the rear and adds a supplementary battery, a tripod thread and a larger, two-stage shutter button.

In practice, the main bonus of the 41-megapixel sensor is the ability to zoom into a scene without the need for bulky optics. This can be achieved in-shot, by dragging a thumb up and down on the display, or by cropping into the image after snapping. You can even re-crop a zoomed-in shot after the fact, since it always keeps a copy of the full-resolution image.

How does it work? Brilliantly. It produces far more detailed zoomed-in snaps than a standard smartphone camera, and it works with video, too, allowing lossless, 4x zoom on 1080p footage, or 6x zoom on 720p. We'd have preferred the in-video zoom to be less jerky, however.

The second benefit is oversampling. At the same time as capturing the high-resolution image, the 1020 creates a second, 5-megapixel photo. Thanks to the extra pixels in the bigger image, the image-processing software can perform noise reduction in the final, lower-resolution image.

All this combines with an effective optical stabilisation system to produce a camera that, in terms of all-round quality, tops every other smartphone camera on the market. In low light, it's better than even the Galaxy S4 zoom – although that phone's 10x optical zoom beats the 1020 for far-off subjects.

▲ Nokia has crammed a 41-megapixel snapper into the Lumia 1020

Thankfully, it's a pretty good smartphone, too. You get the usual bundle of Nokia apps, including free global satnav with local maps, Nokia Music, the same Smart Cam software we first saw on the Lumia 925, and the Microsoft Office mobile apps. In addition, making phone calls was a pleasure, with crystal-clear audio at both ends.

Browsing the web feels slick and smooth: the 1020 recorded a speedy SunSpider score of 896ms – around the same as the 920. However gaming power is limited, as a result of 6.1fps in the GFXBench T-Rex HD test suggests.

Battery life is its weakest area, with 50% remaining after our usual day-long test. Indeed, if you're planning a long day of photography, the battery in the 1020's camera grip makes it an essential accessory.

However, it's all about the camera with the Nokia Lumia 1020, and on this front, it's a huge success; combined with decent smartphone capabilities, it's an alluring proposition. It's expensive, but it's also the most desirable Windows Phone 8 handset yet.

Jonathan Bray

PC & TECH AUTHORITY RECOMMENDED

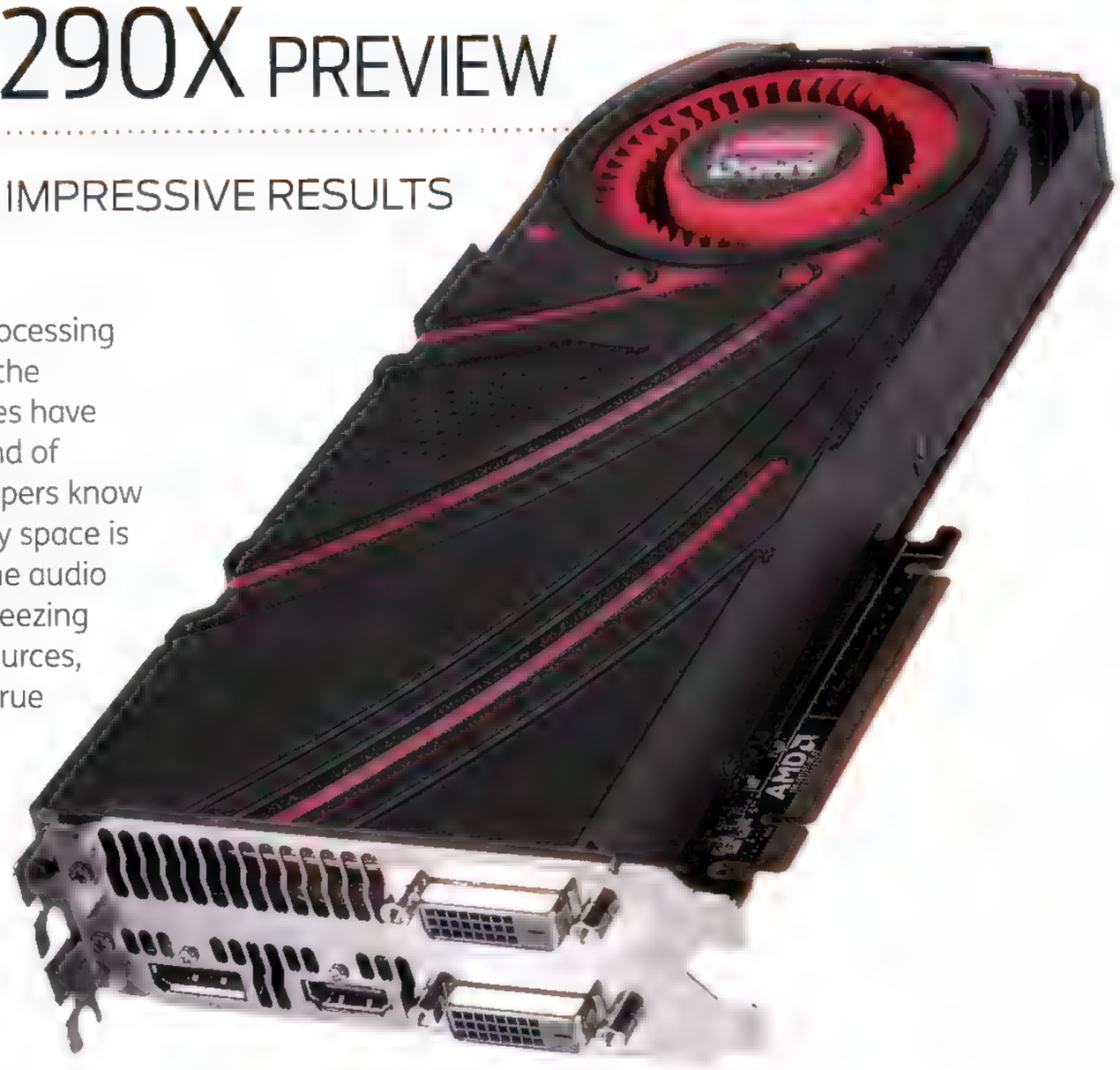
KEY SPECS
Dual-core Qualcomm Snapdragon S4 1.5GHz CPU · 1GB RAM · 32/64GB storage · 4.5in 768 x 1280 OLED display · quad-band GSM/GPRS/EDGE, tri-band 3G/HSDPA, five-band 4G · Bluetooth 3 · dual-band 802.11abgn Wi-Fi · 38MP stills · 1080p video · 2000mAh battery · Windows Phone 8 · 1yr RTB warranty · 71 x 10.4 x 130mm (WDH) · 158g

PERFORMANCE	★★★★★☆
FEATURES&DESIGN	★★★★★★
VALUE FOR MONEY	★★★★★☆
OVERALL	★★★★★☆

▼ The optional grip adds an extra battery

AMD RADEON HD R9 290X PREVIEW

AMD DROPS A NEW HIGH END GPU, WITH SOME IMPRESSIVE RESULTS



PRICE $TBA
SUPPLIER www.amd.com

During AMD's GPU14 event in October the company lifted the lid on a complete rebranding of the Radeon GPU line-up. Gone are the four digit numbers of the past, and in their place are two major series of cards, the R7 line of mainstream products and the R9 line of enthusiast cards.

A lot of the products within are slightly tweaked versions of the existing line-up, but there are two distinctly new GPUs to be found, the R9 290 and the R9 290X. These take AMD's existing Graphics Card Next architecture and ramp it up in an attempt to kill Nvidia's lead at the high end of the performance spectrum. This is crucial from various perspectives, and in many ways it feels like AMD has hastened the launch of these cards. Not only did we get the overwhelming feeling at Computex this year that Add In Board partners (AIBs) were despairing at the lack of solutions on AMD's 2013 roadmap, but only a handful of the new products feature some crucial new technologies that one would usually expect to launch in concert with an entire line-up refresh.

Not that the origin of the 290 and 290X has too much influence on our opinion of the cards. While both video card manufacturers have nurtured vocal fanbases over the years, we are firmly of the belief that gamers should put aside brand loyalty and focus on which product delivers the best bang for their buck. That said, there is one major addition to the 290 and 290X cards that appears both compelling and easy for developers to implement, one designed to improve the quality of positional audio.

SOUNDS FANTASTIC

This technology has been dubbed TrueAudio by AMD's marketing department and revolves around the inclusion of hardware audio processing on the card itself. It is purely designed to accelerate the processing of audio, rather than the quality of the sound itself, which is still left up to the audio hardware inside your PC.

The inclusion of transistors dedicated to audio on the graphics card relieves some of the processing load on the CPU. AMD gave the example that most PC games have audio added towards the end of production, once the developers know how much CPU and memory space is left over. This means that the audio in PC games is all about squeezing the most out of limited resources, rather than an area where true innovation happens.

Even more importantly, the implementation of TrueAudio enables positional audio that is much more accurate than a lot of the current surround sound implementations. This is achievable because the GPU has a lot lower level access to game code than is traditionally possible. After all, the GPU is already creating a 3D rendition of the gaming space, and knows where everything is in relation to the player. It is already rendering that sniper sitting three stories high in the building a few degrees to your left – adding sound to that precise point becomes much simpler than with an audio engine left to work out the positioning on its own.

What makes us more excited about TrueAudio than most proprietary solutions added to graphics cards (Nvidia's PhysX is a prime example here) is that it will work with simple middleware updates. Developers will be able to get a decent level of support for the technology by enabling it in common audio middleware like Wyse, while still having the option of focusing down on more advanced features (which we expect to see happen in a few of AMD's 'Gaming Evolved' titles). We spent a small amount of time with Eidos Montreal's upcoming reboot of Thief, with some fairly middling stereo headphones and the effect was impressive to say the least. That said, we expect to see wider implementation of TrueAudio once AMD comes out with new mainstream GPUs next year, and it will likely take a while before it is implemented widely, so in and of itself it isn't a reason to rush out and buy a 290 or 290x.

While audio is far and away the technology most likely to garner widespread support, there are a few

other bits and pieces worth noting with this new flagship from AMD. It made a big deal of the fact that this card is capable of gaming at 4K resolutions, thanks to some tweaking to the architecture to better support the massive leap in the number of pixels the card needs to output to run a game at 4K. Of course, you only have to read our review of ASUS' PQ321QE 4K monitor on page 50 to know that 4K gaming is still years away from being a compelling, affordable solution. This makes these tweaks interesting, but they are more about paving the way for the future and trying to get ahead of the competition at a resolution that few people use.

THE RADEON 290X

A few days before we sent the magazine to print we received our first Radeon HD R9 290X. Not only is this card an AMD reference model, but we know all too well from experience that driver maturity will improve as actual retail cards come to market. With this in mind, we are treating our evaluation of the card as a preview rather than a review, and while performance will likely improve as we approach launch, we are holding back our final judgement until we see actual retail hardware in the labs.

The 290X is based upon AMD's Tahiti XL GPU design (we have heard it referred to as Tahiti XXL by AIB partners) and sports some serious spec bumps over the Radeon HD R9 280x (formerly known as the Radeon HD 7970 GHz Edition). It has 2816 Stream processors, while the 280X has 2048 of them. It also comes standard with 4GB of RAM running on a 512-bit memory bus – the 280X has 3GB on a 384-bit memory bus. AMD quotes compute performance of the 290X at 5.6 TFLOPS, compared to the 280X's 4.1 TFLOPS.

In layman's terms, the increase in the number of stream processors and compute performance make for a generally more powerful GPU, while the increase in memory bandwidth and capacity is key to enabling better performance at higher resolutions. Of course, this reinforces the fact that the current bleeding edge GPUs are overkill if you are only gaming at 1080p, but those running 2560x1440 or higher resolution will appreciate the changes a lot more.

AT TIMES TITANIC

When it comes down to performance the 290X had us scratching our heads a little. We aren't sure if the results we saw were down to driver maturity or the architecture, but in some benchmarks the card was faster than Nvidia's monster GeForce GTX Titan, while in others performance was more in line with the GeForce GTX 780. Ultimately we will need to wait until we see retail hardware to see if these results are a true representation of performance, so take these preliminary results with a grain of salt.

In our standard Crysis benchmark the 290X only really showed a few frames' performance advantage at very high resolutions. The rest of the time the game was clearly CPU limited, an issue we have found with Nvidia's high-end cards as well (and we are currently re-evaluating our high-end benchmarks with this in mind).

In the more recent Crysis 3 the 290X pumped out 35fps with everything maxed, at 2560 x 1600 resolution,

"In some tests the card was faster than the GeForce Titan, while in others it was closer to the GeForce GTX 780"

which is marginally quicker than our Titan and GTX 780 results and makes for a smooth, enjoyable gameplay experience for all but the most frame-hungry of fps players.

In 3DMark the 290X showed a clear advantage over the competition in the gaming PC focused FireStrike test, scoring 9102 to the Titan's 8389 and the GTX 780's 8187. While this is very much a synthetic test (and one that AMD focused heavily on during its briefings on the 290X), it shows that the card is indeed capable of holding its own against Nvidia's high end products.

CONCLUSION

For now it is safe to say that we are impressed with what AMD has done with the 290X. It is a more than capable card for those wanting to game at high resolutions, and is at the very minimum excellent competition to Nvidia's GeForce GTX 780, while also being able to hold its own against Titan in certain circumstances.

At the time of writing we still hadn't been able to pry pricing information out of AMD, and the only publicly listed Australian price was $799 – which came at a time when AMD told us that its AIB partners hadn't finalised pricing. If AMD can deliver the 290X at this kind of price point then the GPU can be seen as a serious competitor to the GTX 780, but again we need to wait until retail products appear in order to make a proper judgement.

Ultimately though, at $800 any GPU is going to only appeal to a certain subset of gamers, those who hanker for the very best that the industry can offer. For the vast majority of people, the 280X and its ilk can be considered a very reasonable high-end product, excellent at 1080p and great bang for the buck at 2560 x 1440 as well. For now at least the 290X is a great indication that AMD can still deliver at the high end, and we eagerly anticipate the technological advances seen on the 290X rolling out to AMD's entire range over the next year or two.

John Gillooly

John travelled to the GPU14 event as a guest of AMD

ASUS PQ321QE

ASUS DELIVERS THE FIRST 4K PC MONITOR, BUT ITS PERFORMANCE DOESN'T JUSTIFY THE HUGE PRICE

PRICE $4,435
SUPPLIER www.asus.com.au

If you're in the market for an affordable monitor upgrade, the Asus PQ321QE definitely isn't it – this is the first "consumer" 4K monitor to hit the market. With a hulking 31.5in panel, the PQ321QE packs as many pixels as four Full HD screens strapped together and costs almost twice as much as the most expensive display on the A-List.

Just reading through the specifications is enough to get any self-respecting monitor enthusiast frothing. The 31.5in, 3840 x 2160 panel supports a ten-bit colour input and delivers a pixel density of 140ppi – that's 28% higher than our current A-List choice, the 27in, 2560 x 1440 Eizo ColorEdge CG276 (web ID: 381835). To put that in perspective, the Asus has more than double the pixels of even high-end 2560 x 1440 monitors, and offers a sufficiently high resolution to view an 8-megapixel photo in its pixel-perfect entirety.

Asus has selected a Sharp-branded IGZO (indium gallium zinc oxide) TFT panel – a semiconductor technology that shrinks the transistor size, allows for higher pixel densities and promises lower power consumption. Asus doesn't state the type of panel technology employed by the PQ321QE, but given the specifications – a claimed maximum brightness of 350cd/m2, 800:1 contrast ratio and 178-degree vertical and horizontal viewing angles – it's almost certainly using an IPS or PLS panel.

Despite its single DisplayPort input, getting the PQ321QE up and running isn't straightforward. Straight out of the box, the DisplayPort input accepts only a 3840 x 2160 signal at 30Hz – in this mode both games and videos are limited to a stuttery 30fps.

To get a 60Hz signal, you must enable the multistream transport mode in the Asus' onscreen display. With that done, the monitor appears in Windows as two separate 1920 x 2160 screens, which must be joined together to form one desktop. This worked well on the integrated graphics in our Haswell test PC – we enabled the Collage mode in the Intel control panel – but getting it up and running with AMD and Nvidia graphics cards required a fair amount of faffing with beta driver releases. Hopefully, such issues will be resolved in future driver updates.

Viewing the Windows desktop at 3840 x 2160 is an initially disconcerting experience. It's necessary to crank Windows' scaling settings right up to keep text legible, and applications that don't have DPI-aware interfaces produce menus and text so tiny you'll be left reaching for a magnifying glass.

Play to the PQ321QE's strengths, however, and it's hard not to be impressed. 4K video clips on YouTube and upscaled 1080p content exhibit a staggering amount of detail, and games run at native resolution have to be seen to be believed. Of course, the only downside here is the sheer power required to shunt all those pixels to and fro. We experienced stuttery mouse movement and video playback while running on integrated graphics, and even the fastest Nvidia and AMD graphics cards in our Labs struggled to produce playable native-resolution frame rates in Crysis. If you're planning on building a gaming PC around this, you'll need top-flight hardware and a powerful pair of graphics cards at your disposal.

Image quality is more of a mixed bag. With wide viewing angles, a measured maximum brightness of 428cd/m2 and a contrast ratio of 765:1, the PQ321QE delivers on Asus' claims. Colour accuracy is wayward compared to the finest professional displays, though, and while the sRGB mode gave the best results, it was by no means perfect. Our X-Rite colorimeter measured an average Delta E of 3.2 and a maximum deviation of 10.4, where Eizo's ColorEdge CG276 managed a far superior average of 1.3 and a maximum of only 3.9. For colour-critical photo or video editing, the Asus simply isn't up to snuff.

Given its professional aspirations, the PQ321QE is light on features. The stand provides 150mm of height adjustment, as well as tilt and swivel, but there's no portrait mode and it's wobblier than we'd like – it's nowhere near as solid as Eizo's ColorEdge CG276. Hardware calibration isn't on the cards, either – which we'd expect at the price – and while the fiddly onscreen display provides some manual white-point adjustment, there's nowhere near the depth of adjustability of professional rivals.

▲ The 4K panel delivers crystal clarity, but colour accuracy is average

Connectivity is limited, too. In addition to the single DisplayPort input on the left-hand side, the only other connectivity is a 3.5mm audio input, and the Asus' internal stereo speakers aren't anything special. With only 2W of amplifier power behind them, they're incapable of mustering the vigour to match the pixel-sharp visuals, and are best kept for emergencies.

Remaining at the cutting edge of technology is a costly pursuit, but, ultimately, the Asus fails to justify its price. It doesn't provide the image quality or features we'd expect from a professional monitor, and while affluent gamers might be tempted just to say they have a 4K gaming PC setup, the hardware costs will prove prohibitive and offer little benefit over cheaper 2560 x 1440 monitors. If you're desperate to spend $4500, our advice is simple: buy a pair of ColorEdge CG276 monitors instead – and a new video card!

Sasha Muller

KEY SPECS
31.5in 3840 x 2160 TFT • 350cd/m2 brightness • 800:1 contrast ratio • DisplayPort • 3.5mm audio input • VESA 200 x 200mm mount • 3yr RTB warranty • 750 x 256 x 489mm (WDH)

IMAGE QUALITY	★★★★½
FEATURES&DESIGN	★★½
VALUE FOR MONEY	★★½
OVERALL	★★★½

SAMSUNG GALAXY NOTE 3

WHILE NOT FOR EVERYBODY, THIS IS FAR AND AWAY THE BEST PHABLET TO DATE

PRICE $890
SUPPLIER www.samsung.com.au

When Samsung unveiled its first Galaxy note a mere two years ago there was a massive amount of scepticism as to whether people actually wanted a gigantic smartphone. Fast forward and the company has now launched its third generation of Phablet to a relatively small but highly dedicated audience of converts.

The Galaxy Note 3 is the best Phablet to date. Not only is it thinner and lighter than previous Notes, it gives off the illusion of being smaller thanks to a thinned down bezel. This is in spite of the fact that the screen is actually larger than previous generations of Note, measuring 5.7in. This comes with a bump in resolution to 1080p, which combines with the excellent AMOLED technology to make for a crisp, gorgeous display that is bright enough to read in direct sunlight.

While the overall design aesthetic is reminiscent of Samsung's flagship Galaxy S4 handset, we much prefer the textured plastic backing on the Note 3 to the S4's relatively slick rear. Designed to look like faux leather (an odd description but the best we could come up with), it feels fantastic in the hand and eliminates any worries that it might slide out of our grip. These factors all combine to make for a device that feels good to hold for any amount of time, something too sadly neglected in some smartphone designs.

Under the hood of the Note 3 sits some very powerful hardware, similar to the Galaxy S4. There is a quad core Snapdragon 800 processor running at 2.3GHz, full LTE support and 32MB of memory as standard. Like its predecessors the handset houses a stylus, which we found doesn't get as much use as you'd expect, but is always there if you need the precision that it brings. It also brings the IR blaster functionality of the Galaxy S4 to the Note range, which turns the handset into a universal remote.

In many ways the Note 3 is the most advanced handset currently available. Not only does it join the HTC One and Galaxy S4 in supporting the latest 802.11ac Wi-Fi standard, but it is also the first handset we have seen with native support for USB 3. This means that the USB port at the bottom of the phone is wider than the standard micro USB, but is actually completely compatible if you don't have a USB 3 cable on hand – we found it charged slower when connected to a standard micro USB cable, and obviously transferred files at a lower speed, but you don't actually need to replace your accessories just because the port at the bottom has changed (unlike Apple's shift to the lightning connector).

Like most modern smartphones the Note 3 is designed for daily recharging, although we found in our tests that heavy usage didn't have you rushing to recharge midway through a day. With LTE running and Bluetooth active, the massive 3200mAh battery still had 47% charge after 12 hours of use.

While we are sceptical of benchmark results, thanks to some websites discovering that the Note 3 ramped up its CPU speed when it detected a benchmark running, the results are fantastic and in our time using the handset we never felt that the phone lacked grunt. For reference, we saw a quadrant score of 17386 and a Geekbench score of 3996.

The Note 3 is an excellent evolution of the series and is by far our favourite large-screen phone. It is powerful; long lasting and has some noticeable improvements over the previous Notes. Ultimately its suitability will come down to whether or not the form factor is suitable for your needs – we know enough people in the pro- and anti-Phablet camps to try and make that decision for you. But if you want a larger screen than standard, and are prepared for the compromises that feature brings, the Note 3 is far and away the best option. Yet another truly excellent piece of hardware from Samsung.

John Gillooly

▲ The textured plastic on the rear is a great addition

PC & TECH AUTHORITY RECOMMENDED

KEY SPECS
2.3GHz Snapdragon 800 · 5.7in 1920x1080 AMOLED screen · 3GB RAM · 32GB storage · Micro SD · LTE, 13MP camera · 3200mAh battery · 802.11ac · USB 3

PERFORMANCE	★★★★★★
FEATURES&DESIGN	★★★★★★
VALUE FOR MONEY	★★★★★☆
OVERALL	★★★★★★

LEAP MOTION CONTROLLER

A GESTURE CONTROLLER THAT MAKES US WANT TO THROW OUR HANDS UP IN FRUSTRATION, NOT TOWARDS THE PC

PRICE $129.95
SUPPLIER airspace.leapmotion.com

Few products have generated as much hype as the Leap Motion gesture controller; none have so miserably failed to live up to their billing.

In theory, the Leap Motion Controller allows you to navigate your desktop via natural pointing gestures, and to select items on the screen by poking towards them. In our tests, on a variety of laptop and desktop PCs, we did indeed find it just about possible to scroll through the Windows 8 Start screen by gesture alone.

Even with a steady hand, however, we found the onscreen pointer often wobbled uncontrollably, while at other times it was impossible to target items at the edges of the screen, or to locate the pointer at all.

Another big problem was selecting items. The Leap Motion sensing area is divided into two zones: the "hover zone", away from the monitor, where the device recognises gestures, and the "touch zone", which detects the equivalent of left mouse clicks. The invisible dividing line between these two zones is directly above the sensor, but we found we had to dangle a finger in the touch zone for a good couple of seconds for a "click" to be recognised. Trying to accurately select a small item – such as a link on a web page, for example – borders on the impossible.

In part, the problem is that the Leap Motion Controller is a rudimentary device. Whereas Microsoft's Kinect uses a combination of RGB camera, depth sensor and motorised pivot, Leap Motion relies on two cameras and three infrared LEDs inside a static 3in box.

Even if the hardware worked perfectly, the sheer arm-aching awkwardness of navigating your PC by gesture would still kill the idea. We've just about grown accustomed to swiping laptop screens, but dangling your arm in mid-air to select items and scroll through menus is tiring. Also, with no Kinect-like option to switch off tracking with a voice command, we often found ourselves accidentally activating the Leap Motion when we went to pick up the phone, for instance.

In short, we could find nothing to do with the Leap Motion that we couldn't do more accurately, more conveniently and more comfortably with a mouse and keyboard. On the plus side, at least it isn't big enough to break the pane when the moment inevitably arrives to throw it out of the window.

Barry Collins

KEY SPECS

Windows 8/7 or OS X 10.7 and above • USB 2 (cable included) • 1yr limited warranty • 30 x 76 x 13mm (WDH) • 32g

PERFORMANCE ★★☆☆☆
FEATURES&DESIGN ★★☆☆☆
VALUE FOR MONEY ★☆☆☆☆
OVERALL ★☆☆☆☆

PLANTRONICS RIG

ONE OF THE MOST VERSATILE AND FULLY FEATURED GAMING HEADSETS ON THE MARKET

PRICE $130
SUPPLIER www.plantronics.com/au

There's something really nice about being surprised by a product. When you see as many new bits of kit as we do, it's rather easy to get blasé about things; but this headset from Plantronics is really unique, and quite literally new in the gaming headset space.

A lot of gaming headphones come with inline volume controls, but there's been nothing like the RIG's mixer unit. This single unit lets you plug in your phone or tablet, and mix the sound from your voice chat, your game, whatever music you like to listen to, and even take calls. Two sliders let you swap from game to phone modes, and you can mix volumes to get everything just right to listen to everything at once.

As great as this functionality is – and it works a treat – we're just as impressed by the design nous that's gone into how the boom mic and other cables attach the headset itself. We've seen a number of attempts at making a set of gaming headphones versatile enough that you can unplug the mic and then use the 'phones on the street, but they always leave a tell-tale jack behind (though Razer came close to nailing this problem with a clever jack insert). Plantronic's solution is to make a single universal mount that fits the boom mic into the cable. You can swap cables and you'd never know it was a gaming headset.

Even the design is more in line with classic street wear, making this a truly universal headphone, um, rig!

As to sound, arguably the most important part of the picture, it's the usual Plantronics quality. There are three useful presets for EQ, and Plantronics has deliberately kept the sound as natural as possible across the board – no over-pumped bass here. Game effects sound sharp and clear, voice audio is solid, and music is a pleasure. Keen audiophiles will likely be better-served by Sennheiser cans, but given the price you're getting great sound quality with a true set of best of breed features.

For the versatility alone, this is probably our pick of gaming headsets on the market. Well played.

David Hollingworth

PERFORMANCE ★★★★★
FEATURES&DESIGN ★★★★★
VALUE FOR MONEY ★★★★★
OVERALL ★★★★★

CORSAIR CARBIDE AIR 540

CORSAIR DELIVERS ITS FIRST HIGH-AIRFLOW DESIGN, AND IT'S ANOTHER AMAZINGLY UNIQUE BUILD

PRICE $199
SUPPLIER www.corsair.com

Coolermaster delivered its first High Air Flow designs a few years ago now, under the HAF moniker, and since then we've seen a number of casemakers take on the challenge of improving cooling in a case through unique designs. Silverstone's Raven turned mobos on their side to get heat flowing up and out of the case, while Thermaltake took an amazingly compartmentalised swing at the problem, with its Level 10 case design.

Corsair's take on getting the maximum air to your hot parts (oo-er) is the new Carbide Air 540, a cube-shaped case that will not suit all tastes – or even all desks/gaming setups – but that nonetheless wins points for original thinking.

The key to what Corsair's trying to achieve with the Air 540 is hinted at in the exterior design. The right-hand side of the case is smooth, lightly rubberised and fully enclosed. The left-hand side boasts long strips of open mesh on the front fascia and top panel, and the side-panel is almost all window. There are two vertically oriented 5.25in drive bays on the right, above the IO ports.

So what's going on?

The neat trick that Air is pulling off is dividing your PC's components into two different cooling zones. On the enclosed side, you've got caddies for the optical drives or front bay controllers, and four tool-less caddies for SSDs, plus a tonne of space. There's a dividing panel just off the case's centreline, and on the left you've got everything else – mobo, CPU & ram, and video card, all cooled by two 140mm intakes.

There are rubber-grommeted cable runs all round the mobo plate, so you can easily run everything into the other, semi-hidden compartment, and keep the airflow in the main one unobstructed. It also means you get one of the more noisy bits of some systems – the PSU – more isolated.

There's a tonne of room on the left-hand side, both for large video cards, and for full-height CPU coolers. At the bottom of this side you also have two slide out caddies for 3.5 or 2.5in drives, and both of these are hot-swappable.

Though pretty well-specced for cooling right out of the box, there's ample room for more fans on the top of the case, or even for installing a full liquid cooling setup. The full side window will make sure no matter what you build into the Air 540, it will certainly look its best, and the ability to shove all the cabling handily away helps even more in the neat build stakes. Its squat shape, as we said, is the only real sticking point, as there's simply a lot of home computing setups where we imagine it just won't fit. It's also a touch expensive just for the innovation of being cube-shaped.

But if you've got the room, and don't mind the cost, this is a great case for keeping hot gear cool, and showing it off to great effect!

David Hollingworth

atomic hot award

KEY SPECS

415 x 332 x 458mm • 8x expansion slots • 2x 5.25in drive bays, 2x 3.5/2.5in hot-swap drive bays, 4x 2.5in drive bays • 2x 140mm fans (front), 1x 140mm fan (rear) • 2x USB3, audio ports • up to E-ATX mobo • steel and plastic construction

PERFORMANCE	★★★★★★
FEATURES&DESIGN	★★★★★★
VALUE FOR MONEY	★★★★★☆
OVERALL	★★★★★★

LABS BRIEFS

FRACTAL DESIGN R3 1000W NEWTON

PRICE TBA
WEBSITE www.fractal-design.com

After they've consistently impressed us with their cases, this is the first PSU that we have seen from Fractal Design. With a striking glossy white design, the 1000W Newton is very clearly designed to fit into the two tone internal aesthetic of the company's cases, although we will leave the aesthetic judgements up to you.

With an 80 Plus Platinum rating and a decent number of outputs, this is a good all-rounder, although at 1000W it would be overkill for all but the heaviest of users. In our testing power delivery was clean, and the unit ran with barely a whisper (it is yet another PSU where the fan spins only some of the time).

While we are yet to see local pricing, indications are that it will be competitive with other good 1000W units. As long as this is the case, we consider this a serious contender.

John Gillooly

OVERALL ★★★★★½

OZONE RAGE 7HX

PRICE $70
WEBSITE ozonegaming.com

The gaming headphone market has never been tougher, with some truly excellent audio solutions being delivered at very reasonable prices. The Ozone Rage 7HX does not fall into this category. At first glance they both look good and were light enough to not cause neck aches during long gaming sessions. Plug in the USB and fire up the drivers, and the audio quality is decent, if a little bassy for our liking. We also found the push button volume controls to be annoying due to a lack of indication of level – give us a dial any day. These are reasonably priced for a software 7.1 headset, and are decent enough, but aren't quite up to the level of quality being delivered by some competitors at the pricepoint. If virtual surround is a must, then these are a competent option, but ultimately we would much rather spend an extra $10 on Tt eSports' astonishingly good Cronos stereo headset rather than settle for these.

John Gillooly

OVERALL ★★★★☆☆

TESORO COLADA

PRICE $230
WEBSITE www.tesorotec.com

Tesoro is a newcomer to the local market, and a brand of peripherals that we haven't encountered in the past. Suffice to say, after our experience with the Colada we will be keeping an eye on it from now on. Our test unit features Cherry MX Red switches, with other switch options available. The version we tested sported a gunmetal grey aluminium housing, which conveys an incredibly sturdy feel to the unit, which is also strangely cool and sensual to the touch. There is adjustable blue backlighting, which can be set to everything or to a subset of keys, and this is complemented by a relatively subtle set of strip lights on the side that bathe the desk in a gentle blue glow. It also has audio passthroughs, and a DC input in case you want to have the two included USB ports properly powered (it doesn't come with an adapter, however). It has been a while since we have seen such an impressive debut into the Australian market, and while the mechanical keyboard space is crowded, the Colada is excellent. Our only concern is the price, and that there are great solutions out there for significantly less.

John Gillooly

OVERALL ★★★★★☆

MICROSOFT SCULPT COMFORT MOUSE

PRICE $35
WEBSITE microsoft.com

Microsoft continues to make some excellent mice for a narrow range of uses, and the Sculpt Comfort is a great example. This cheap unit is designed to work alongside Windows 8, and uses bluetooth to connect (which means you'll need a PC running Windows 8/8.1 and inbuilt bluetooth, since it doesn't come with a dedicated receiver).

It is also very much for right-handed users only, with a mildly ergonomic design and giant blue start button on the side, which also supports a degree of touch-based interaction (simple swipes, basically). It has discreet left and right buttons, and a tilt scroll wheel, which is enough for light users of Windows. To make the most of it you'll need to be using Windows 8 as Microsoft intended, rather than our favoured way of avoiding anything to do with the modern UI, but if you do this is a very reasonably priced option, and one that benefits from its tight integration with the OS.

John Gillooly

OVERALL ★★★★☆☆

XFX RADEON R9 280X

PRICE $399
WEBSITE xfxforce.com

The Radeon R9 280X is effectively a rebrand of the existing 7970 Ghz edition card, with some tweaks to the outputs in order to enable three-screen output via HDMI/DVI.

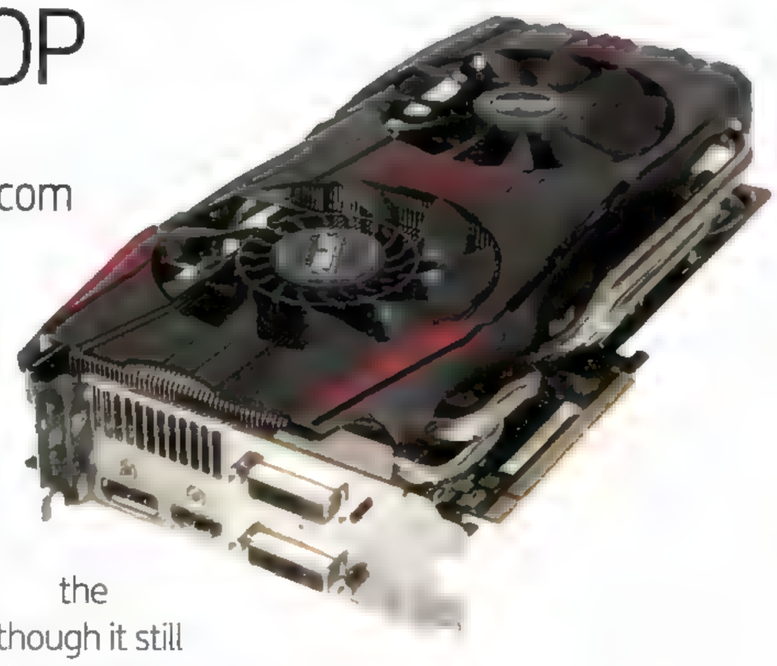
In a world where differentiation between different brands of cards is slight to say the least, XFX is continuing down the path of implementing stylish heatsink design as a differentiator from the pack, this time with a black plastic two-slot shroud that features chromed highlights. We did find that plugging in the power had us worrying that we might slice our fingers due to the proximity to the overlying heatsink, but this wasn't the case and ultimately it isn't an ongoing issue unless you are constantly swapping graphics cards (a very small subset of us). Performance was more than adequate, especially at 1080p, and still quite competent at 2560 x 1440. We have tested the Black OC Edition of the card which comes with a moderate factory overclock, and while we did see it pull ahead of standard cards by a frame or two in our testing, for the average gamer this isn't going to be a noticeable boost.

John Gillooly

OVERALL ★★★★★☆

ASUS RADEON R9 280X DCUII TOP

PRICE $419
WEBSITE www.asus.com



This month has marked a flood of new R9 280X cards, which appeared soon after the rebranding was announced. The DCUII TOP model from Asus uses the company's iconic design, although it still has the minor annoyance of a heatsink that doesnt quite look like it was custom made for the card. We aren't as worried about this as we are when ASUS commands a serious premium over the standard price though, with this model coming in at less than $20 more than what AMD has quoted for the GPU. The handpicked nature of the GPUs on the card mean that it can deliver a few more frames than stock, but like the other models on this page, the boost isn't really enough to make you rush out and choose one model over another based purely on factory overclocks. We do like this design though, with little touches like the metal shroud and LEDs designed to let you know whether or not the power is properly connected being the highlights. These are largely cosmetic though, and not a deal-breaker either way.

John Gillooly

OVERALL ★★★★★☆

GIGABYTE R928XOC

PRICE $399
WEBSITE www.gigabyte.com

After the slick metal heatsink design featured on Gigabyte's Windforce cooler for its GTX 780 card, the return to the plastic shroud seems a touch disappointing. This is pure nitpicking however, as the cooler design is still more than adequate and performance is well and truly up to scratch.

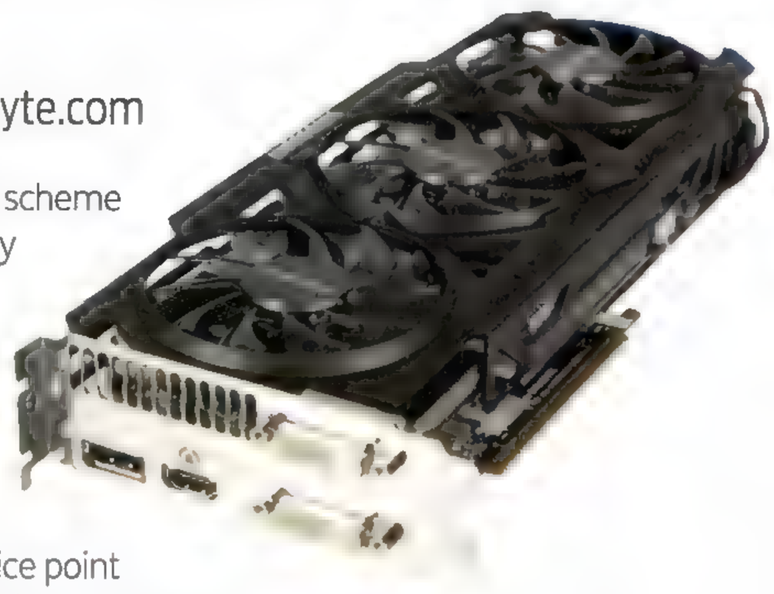
Again, this is a Radeon R9 280X card that comes with a small out of the box overclock, and again this makes little overall difference to the end user. Ultimately it is proof that when it comes to selecting a graphics card you can focus down on finding the best-priced model, or be a bit more flexible with your budget and buy based on your personal aesthetic wants. Despite the confusing nomenclature that Gigabyte has employed for its new Radeon cards, this is still a great R9 280X model, and while it hasn't spent as much time in the hands of a visual design team as the others on this page, it still delivers an excellent level of performance, especially for those with 1080p screens.

John Gillooly

OVERALL ★★★★★☆

GIGABYTE R927XOC

PRICE $285
WEBSITE www.gigabyte.com



In the new AMD naming scheme the R9 270X is effectively the old Radeon HD 7870 GHz Edition, with tweaked outputs like the other rebrands in the range. This makes it quite a reasonable solution, especially at a sub-$300 price point and one that will deliver perfectly good performance for the vast majority of those who game at 1080p. In many ways it is the best price/performance solution in the lineup, and Gigabyte has delivered a solid example with its R927XOC (even if we have the same annoyance at the naming that we do with the R9 280X model from the company – the rebrand is confusing enough without the numbering being further tweaked by third parties). Curiously, this card uses a different shroud to the 280X sample that we received – effectively, it is a plastic version of the one seen on the GTX 780, although we aren't sure if the difference is just a side effect of these being some of the first samples to come out of the factory. A very decent performer at a very decent pricetag.

John Gillooly

OVERALL ★★★★★☆

APPS ROUND-UP

JENNETH ORANTIA REVIEWS THE LATEST AND OCCASIONALLY GREATEST APPS ACROSS ALL THE AVAILABLE MOBILE PLATFORMS

OMNY

PRICE FREE
DEVELOPER 121CAST **PLATFORM** IPHONE

Tired of all the ads and boring bits on the radio? Need to keep your eyes on the road and off your iPhone? The locally-developed Omny takes the idea of a personalised radio station – popularised by services like Pandora – and builds on it by providing more content options.

As well as being able to listen to songs in your music library and supported music streaming services (currently Songl, Spotify and Rdio), you can set Omny up to read out your Facebook notifications, upcoming calendar items, new emails, weather updates and news headlines. The news sources are a good mix of local and international content, between SMH, Sky News Australia Sport and Dr Karl's Great Moments in Science to The Verge and Wall Street Journal.

Using Omny is much like using a music player. You can skip between tracks by swiping your finger across the screen, hit the large pause button if you need to focus on something else, rewind by 30 seconds, and mark something as a favourite. Much like Pandora, Omny becomes smarter the more you use it, using an algorithm to learn the content you prefer listening to. Since there's no music licensing red tape to wade through, you can skip through tracks and stories as often as you want, and – for now – there are no ads.

This first version of Omny is almost perfect, but there a couple of things it could do better. Being able to group content by type or category would give users more flexibility over what they'd like to listen to, such as music only, for instance, or tech-related podcasts and news, rather than have everything thrown together in a random mix.

The email integration is also somewhat lacking, as it only reads out the sender and subject of each email. It would be nice to have the option of having certain emails read out in full by tapping on them on the Now Playing screen.

EASE OF USE	★★★★★★
FEATURES	★★★★★½
VALUE FOR MONEY	★★★★★★
OVERALL	★★★★★★

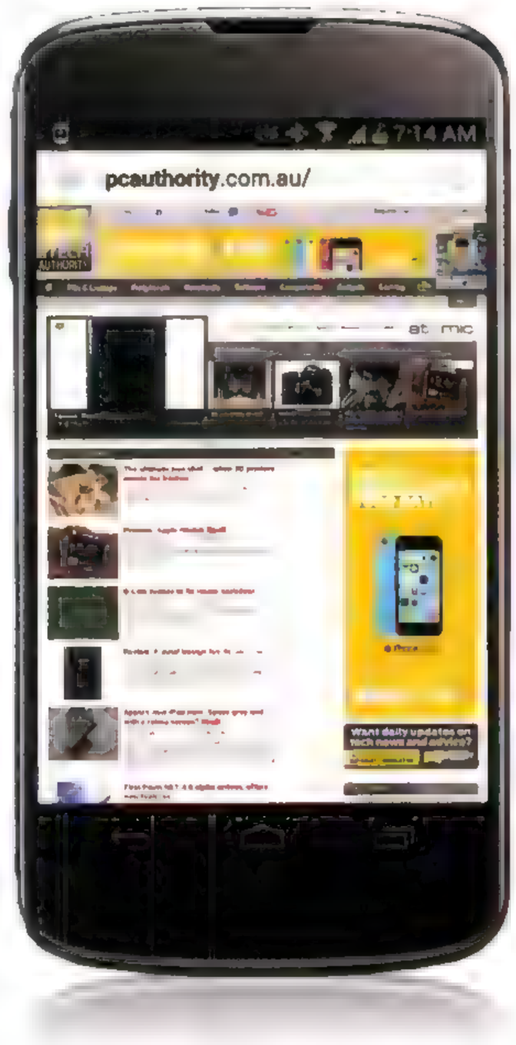
MERCURY BROWSER

PRICE FREE **DEVELOPER** ILEGENDSOFT
PLATFORM ANDROID

There's certainly no shortage of third party web browsers for Android, but Mercury Browser manages to bring a few new features to the mix. Originally debuting on iOS, Mercury Browser has finally crossed the pond to the Android camp, and it brings most – but not all – of the features that made the original such a popular browser for iPhones and iPads.

The sheer number of features and settings available in Mercury Browser will make this a popular app for Android power users. Half a dozen plug-ins come pre-installed with the browser, including a Reader plug-in that strips out all of the formatting on a webpage, Dropbox integration, and an ad blocker.

Unfortunately, there doesn't appear to be any way to add additional plug-ins and it lacks the iOS versions' LastPass and Pocket plug-ins. It's also worth nothing that the Android version doesn't offer bookmark syncing with Firefox and Chrome like the iOS version does – you have to import and export your bookmarks manually.



Despite the dozens of features it offers, Mercury Browser has a delightfully minimal user interface that hides most of the features in a pop-up box that offers up functions and settings in a swipeable panel. The functions section provides easy access to things like the download manager, private mode, and user agent switching (your choices are Android, iPhone, iPad and Desktop), while the settings section lets you swap between day and night viewing modes, change the font size, and access the dedicated settings section.

Want to keep your web browsing activities secret from prying eyes? You'll appreciate the login passcode and the ability to turn off browsing history.

Mercury Browser is also a zippy performer. Zooming in and out of the page, scrolling, panning and tab switching is all lag-free, and it completed the SunSpider Javascript Benchmark 0.9.1 in 593ms, which is marginally faster than the default Internet browser's score of 616.6ms and quite a lot faster than Chrome's 961.3ms (faster is better).

EASE OF USE	★★★★★★
FEATURES	★★★★☆☆
VALUE FOR MONEY	★★★★★★
OVERALL	★★★★★☆

RUNTASTIC SIX PACK

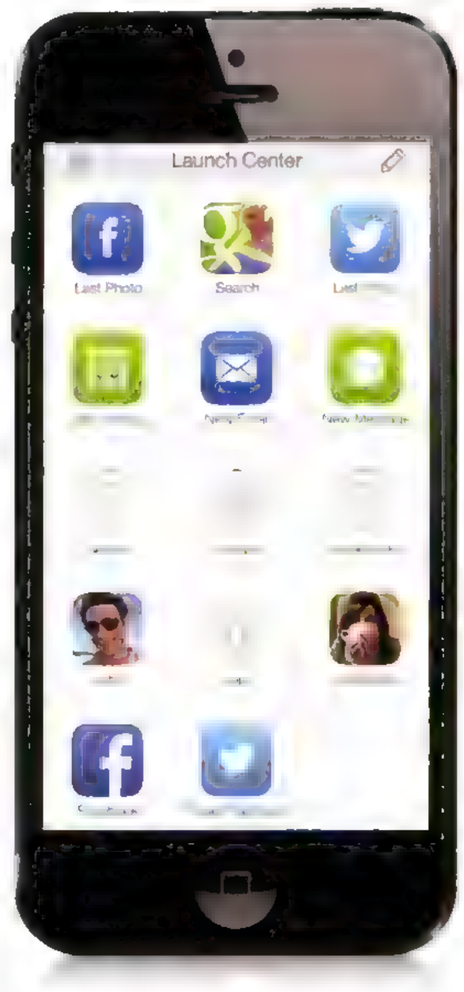
PRICE FREE **DEVELOPER** UNTASTIC
PLATFORM IPHONE, IPAD, ANDROID

If you reckon the phrase 'work your core!' relates to fun ways of eating an apple, then Runtastic Six Pack is probably not the app for you. Created by the developers of the popular running app, the slickly-designed Runtastic Six Pack is all about sculpting your abs into a pinup calendar-worthy six-pack without having to pay for a personal trainer or gym membership. You can customise the six-pack training plan according to your level of fitness, with workouts that can be tailored to your specific goals and schedule and more than fifty Full HD workout videos that you can exercise along to. The base app is free, but there are in-app purchases that unlock various workouts and music packs. You can get the full version with all of the features for $5.99.

OVERALL ★★★★★☆

LAUNCH CENTER PRO

PRICE $5.49
DEVELOPER CONTRAST
PLATFORM IPHONE

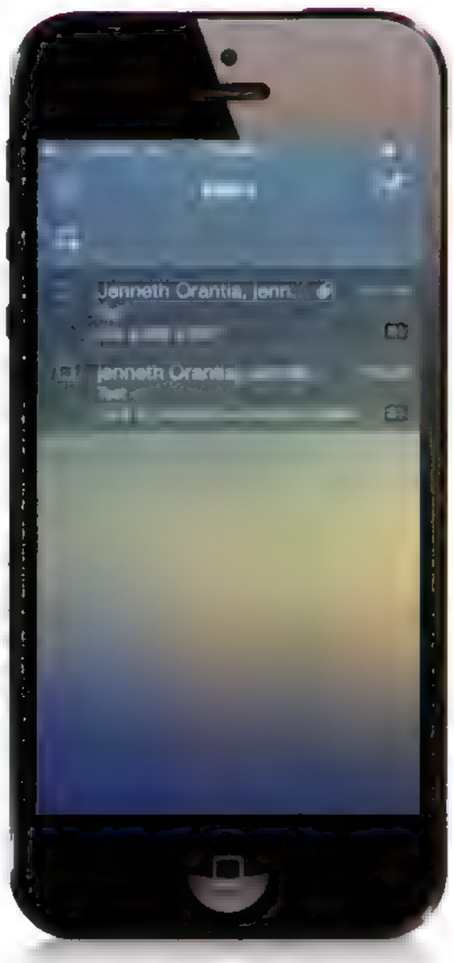


Launch Center Pro is a powerful system utility that brings Android-like customisable shortcuts to iOS. Using the action composer, you can create one-tap shortcuts to perform a variety of tasks such as calling your mum, doing a Google search for a specific term, searching Yelp for the nearest café and composing a text message or email to your boss or significant other. Essentially, it's a speed dial for all of the actions you do on a regular basis on a 5 x 3 grid. Not all of the actions work (the Facebook options in particular appear to be broken), though, and you can't create more than one page of shortcuts. However, you can make the most of the limited space by grouping related shortcuts together, much like iOS homescreen's app folders.

OVERALL ★★★★☆☆

YAHOO MAIL

PRICE FREE
DEVELOPER YAHOO!
PLATFORM IIPHONE, IPAD, ANDROID



Even if you aren't a Yahoo Mail user already, the freshly overhauled mobile apps make the service well worth another look. The new apps for iPhone, iPad and Android user are just as pretty as they are functional, with gorgeous transparency effects, beautifully-designed themes that sync across platforms for consistency, and a collapsible toolbar on the side that keeps the main view deliciously free of clutter. Yahoo has also thrown in many of the features that it used to reserve for Yahoo Mail Plus into the free service, including a whopping 1TB of storage (which Yahoo claims is good for 6000 years of inbox use for the average user), disposable email addresses and POP and mail forwarding. It isn't quite as effective as Gmail at grouping related emails together, however.

OVERALL ★★★★★☆

SLOWCAM

PRICE $1.99 **DEVELOPER** LUCKY CLAN
PLATFORM IPHONE, IPAD

Want to get the slow-mo capabilities of the iPhone 5S without paying for the latest model? There's actually an app for that. SlowCam is a simple third party camera app that gives any device running iOS 7 slow-motion video recording capabilities. Even iPhone 5S users can get value out of the app, as it lets you add more than one slow motion sequence per video (unlike the default Camera app). Since it saves video to the Camera Roll at the standard 30fps, there's also no issue with saving it to services like Instagram and Facebook. For older devices, however, the results aren't quite as good, as they're still limited by the maximum frames per second that each device supports. While the iPhone 5S supports 120fps, the iPhone 5 and iPad mini only support 60fps, and everything earlier than that is stuck at 30fps.

OVERALL ★★★★☆☆

Z87 mini-ITX motherboards

OVER RECENT MONTHS THE PC&TA TEAM HAS BEEN FALLING FOR THIS TINY FORM FACTOR. THIS MONTH WE TAKE AN IN-DEPTH LOOK INTO THE MAJOR PRODUCTS IN THE TINY MOTHERBOARD SPACE

Contents

Asus Maximus VI Impact	61
Asus Z87i-Pro	62
ASRock Z87E-ITX	64
Gigabyte GA-Z87N-WiFi	65
MSI Z87i	66
Buyer's guide	60
How we test	60

HOW WE TEST

The motherboards were tested using an Intel Core i7-4770K, 16GB (2 x 8GB) of Corsair Vengeance 1600MHz memory, a GeForce GTX 680 2GB graphics card and a 256GB OCZ Vector SSD. Cooling was provided by a Corsair H80i for the CPU, with another single cooling fan running at full speed throughout.

We used our own suite of Media Benchmarks to test each board's performance, which tested image editing in Gimp, H.264 video encoding using Handbrake and multi-tasking performance, in keeping with our philosophy of real world testing.

For 3D performance, we used a 60-second sequence from Shogun 2: Total War's built-in DX9 CPU benchmark, and a 60-second manual Skyrim play-through. Performance is tested at fail-safe defaults (with the RAM set to 1600MHz), and again at the board's peak stable overclock. Power consumption numbers are recorded at idle and under full load via Prime 95's smallfft test.

Scores are calculated by comparing the boards on test to each other, rather than the market at large, enabling us to produce a score based on a particular niche or sub-category, rather than comparing a budget mini-ITX board to a super premium ATX model. Performance is calculated by the board's average performance against those also on test right across our benchmarks, at both stock and overclocked settings. The Features score is calculated via a checklist of desirable features, while the Value score is a combination of these two scores divided by the price.

Buyer's guide

We have been on a pretty serious mini-ITX kick in recent months, with several of the team transitioning their home desktops to this wonderful small form factor. You can check out our guide to building such a PC on the website (**www.pcauthority.com.au/mini-itx**), which gives an overview of the hardware you need, and the decisions you need to make when building such a PC.

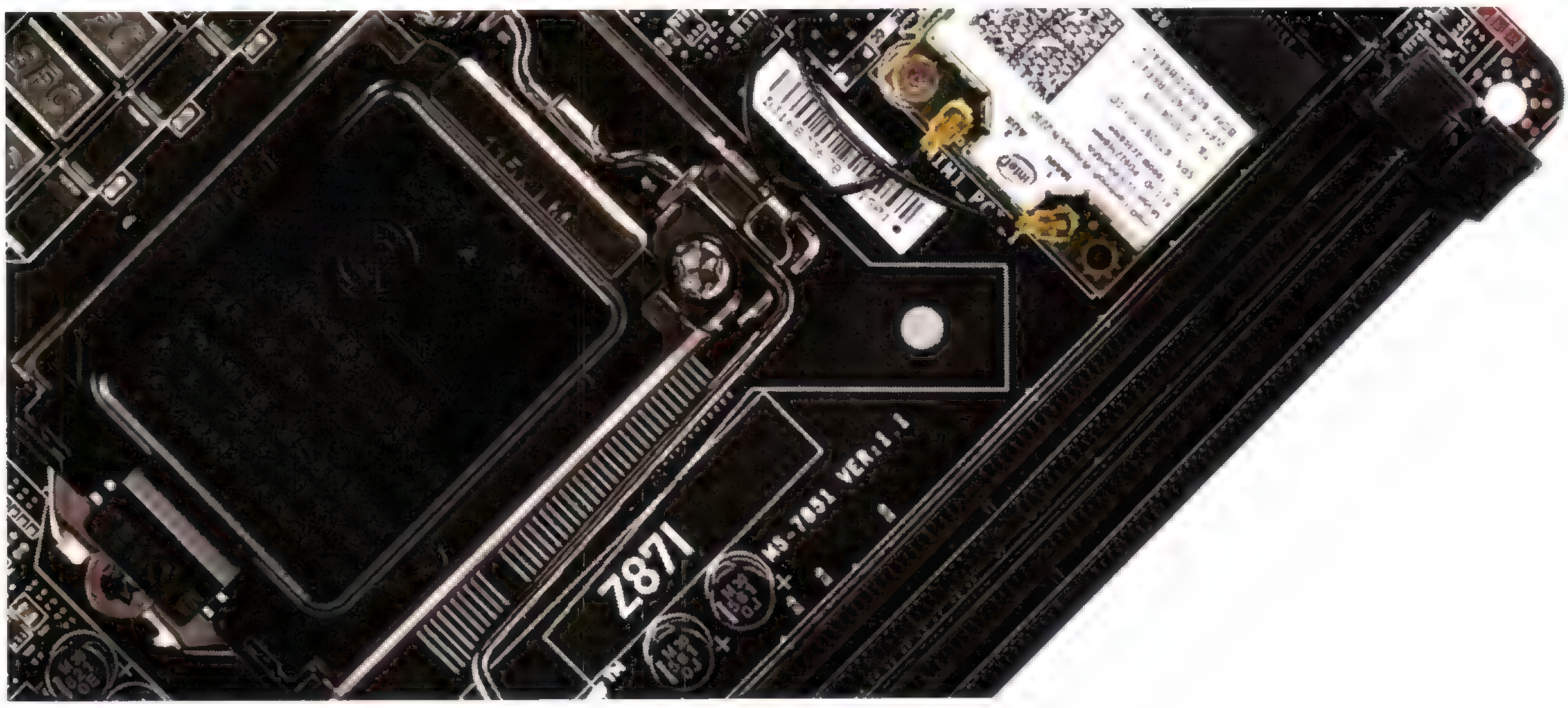
In many ways the most crucial element in such a system is the motherboard. While space restrictions mean that you will never end up with as fully-featured a board as you would in Micro-ATX or larger size, the small differences can be incredibly important. With this in mind we have spent time looking at the small but powerful selection of Z87 products on the market this month, and while we see less variation than we would on larger motherboards, there are some small but significant differences that come into play across the different products out there. Historically mini-ITX has been seen as a novelty, but we are seeing an increased focus from motherboard manufacturers on the form factor, and are also seeing more and more cases being designed around it.

In many ways mini-ITX is starting its move into the mainstream, with attention being paid to it by more than just motherboard makers. Not only are CPUs becoming more and more mobile focused, which means reduced power consumption, and more importantly lower heat output, but case manufacturers are treating the form factor as a serious contender, and focusing their resources on it more than ever before (expect to see some seriously interesting competiton emerge to the likes of the Bitfenix Prodigy over the next year in this space).

We have also seen companies like ASUS release its GeForce GTX 670 mini, one of the most powerful GPUs to emerge in a cut-down form. While this graphics card remains something of an oddity, one that has yet to be updated to the current series of Nvidia GPUs, it is a sign of the importance being placed upon mini-ITX friendly hardware.

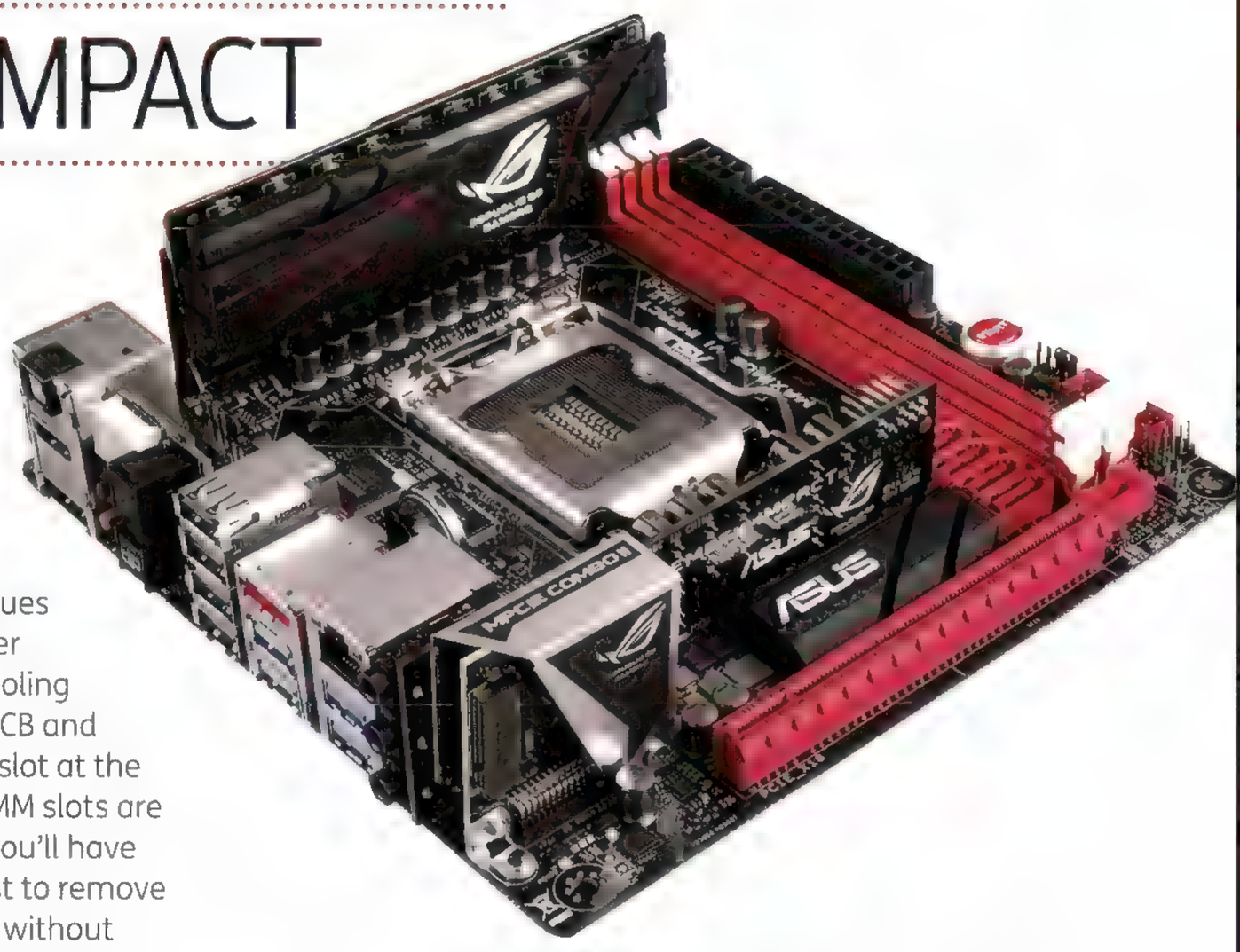
Not that you need to compromise with mini-ITX. One of the key breakthroughs in recent years is the emergence of cases that don't need esoteric hardware. The ability to use standard size power supplies, graphics cards and coolers has been key to enabling mini-ITX systems that pack full sized ATX levels of power.

As you'll see over the following pages, there isn't a massive amount of variation between the different motherboards, especially compared to our usual grouptests, where scores can vary wildly. This is in part because of the restrictions placed by the small size, and the fact that the majority of features are determined by the chipset. For once every single product in our labs is a perfectlyviable option, from the exotic to the budget.



ASUS MAXIMUS VI IMPACT

A FAST BOARD WITH LOADS OF FEATURES, BUT IT'S ALSO EXPENSIVE



PRICE $340
SUPPLIER www.asus.com.au

The Maximus VI Impact sports several features that cheaper boards just can't match. Its rear I/O panel, for instance, sports the only error code readout display in this month's Labs, doubling as a motherboard temperature display. There's also a clear-CMOS switch, a MemOK button to help diagnose memory issues and a button to boot directly to the EFI – useful for overclocking.

The Impact is also the only board on test to have on-board power and reset buttons, with a dedicated VRM daughterboard and accompanying heatsink making other ITX offerings look puny in comparison. There's also a SupremeFX sound daughterboard. Fitted with interference shielding and high-quality capacitors, it bridges the gap between on-board and discrete sound, meaning you won't need an external sound card.

The board's layout, meanwhile, is mostly sensible, with the board's 24-pin and 8-pin EPS 12V power connectors aligned along the right-hand edge rather than awkwardly crammed in the middle of the PCB.

The same edge also houses the chunky USB 3 header and one of the board's four 4-pin fan headers. The placement of the four SATA 6Gbps connectors could be better, though, as they're sandwiched between the DRAM and PCI-E slots, making maintenance tricky in a system you've already built.

The rest of the board isn't without fault either, with many of the same issues that afflicted Asus' cheaper Z87i-Pro. The large VRM cooling module at the top of the PCB and the proximity of the PCI-E slot at the bottom mean that the DIMM slots are extremely cramped, and you'll have to be dexterous if you want to remove your RAM or graphics card without taking all the components out of the machine. The Impact is also the only board in this test not to include an on-board Wi-Fi module. The biggest issue, though, is price. At $340, this is the most expensive motherboard on test; it's almost twice the price of the MSI Z87i. This is an awful lot of money, even with the enthusiast features.

The Maximus delivered a dominant performance in our Media Benchmarks. When running at stock speed, it was the best performer in every test, with an overall score of 2536 points. The Impact also topped the stock speed tables in Skyrim and Shogun 2, and snuck ahead of the cheaper Asus board in SATA tests.

With its RoG pedigree, the Impact also delivered when it came to overclocking, being one of only two boards on test to take our Core i7-4770K to 4.7GHz, and doing so with just a 1.23V vcore. The EFI layout is also easy to navigate and responsive. When overclocked, the Impact proved the best board on test in both the image editing and multi-tasking tests, and only the ASRock board proved quicker in our video encoding benchmark. It all adds up to a good score – the Asus' overclocked overall score of 2917 is this month's best.

There wasn't much to choose between the five boards in our overclocked gaming benchmarks though. The Asus' 109fps minimum in Skyrim was just 1fps behind the ASRock, and its 35fps Shogun 2 result was equalled by three other boards.

CONCLUSION

The Asus Maximus VI Impact proved to be an excellent performer in our benchmarks and it's filled with high-end features that not only make overclocking easy, but negate some of the limitations of a mini-ITX build. It's an undeniably attractive component, but at $340, its price is a steep premium over the likes of the MSI Z87i, which perform to within a few per cent of the Impact's results for half the price. As such, it's the essence of an Extreme Ultra product, offering loads of features and a lightning turn of speed, but for a hefty premium. **MJ**

PERFORMANCE	★★★★★★
FEATURES&DESIGN	★★★★★★
VALUE FOR MONEY	★★★★☆☆
OVERALL	★★★☆☆☆

ASUS Z87I-PRO

A BOLD PCB DESIGN, A GOOD EFI AND NIPPY PERFORMANCE

PRICE $200
SUPPLIER www.asus.com.au

It might be the cheaper of the two Asus boards on test, but the Z87i-Pro will still lighten your wallet by $200. It stands out for more reasons than its price tag, though, thanks to Asus' bold design. The PCI-E slot, RAM slots and SATA connectors are golden-yellow, in contrast to the black PCB.

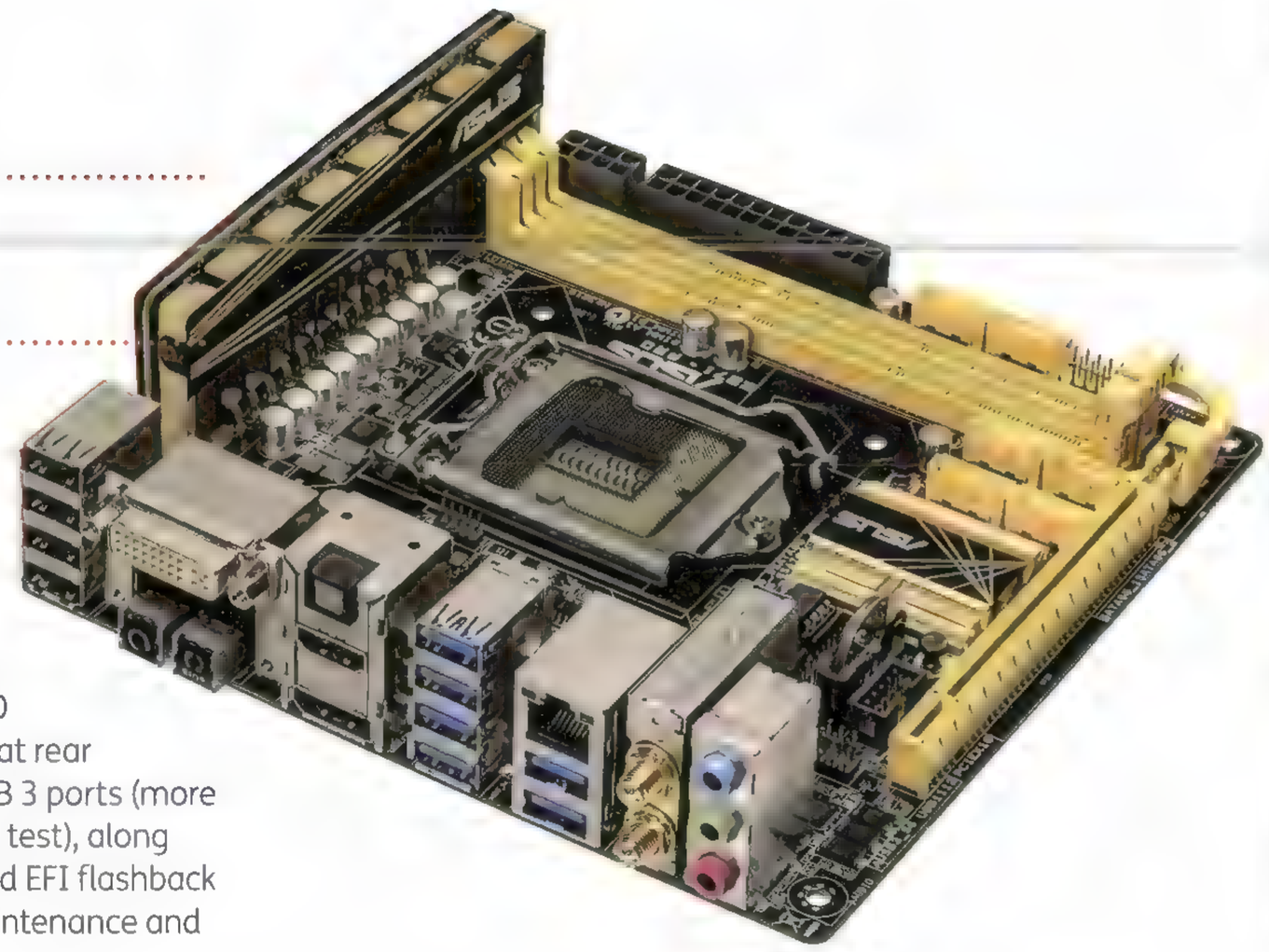
The Z87i-Pro also packs in several features that draw the eye. It has more VRM cooling than the competition, thanks to a chunky heatsink fitted to a daughterboard. It's basically the same dramatic system seen on the Asus Maximus VI Impact, but with a different colour scheme. This effectively leaves more room to tweak the board layout, so both the power connectors are aligned along one edge of the board, with two SATA 6Gbps ports also installed along an outer edge for easy access.

It isn't all good news in terms of layout though. The two DIMM slots are very close to the VRM heatsink board, and almost touch the PCI-E slot too. We had to be very careful when accessing the memory and graphics card – removing one or the other, or both, is advisable. Four SATA 6Gbps ports also sit very close to these slots, and several front-panel connectors are hidden away behind the rear I/O panel too. Thankfully, that rear I/O is packed with six USB 3 ports (more than any other board on test), along with dedicated CMOS and EFI flashback buttons, making EFI maintenance and updates easy.

The Z87i-Pro can store two BIOS files, and its EFI is the best on test. Its home screen serves up more information than any other board in the Labs, its range of tweaking settings is easily accessible and it's responsive. Another neat touch is that, when you tap the F10 key to save and exit the BIOS, a pop-up window details your changes.

The Z87i-Pro stormed ahead in our stock speed benchmarks, producing some of this test's best scores. Its image editing result of 2107 is equal to that of the Maximus VI Impact, and its overall score 2525 puts it 166 points ahead of any non-Asus board too. It excelled in our gaming tests and storage benchmarks too.

We couldn't get the Asus to boot with our CPU overclocked to 4.7GHz, but we did get it running at 4.6GHz thanks to the EFI's precise settings.

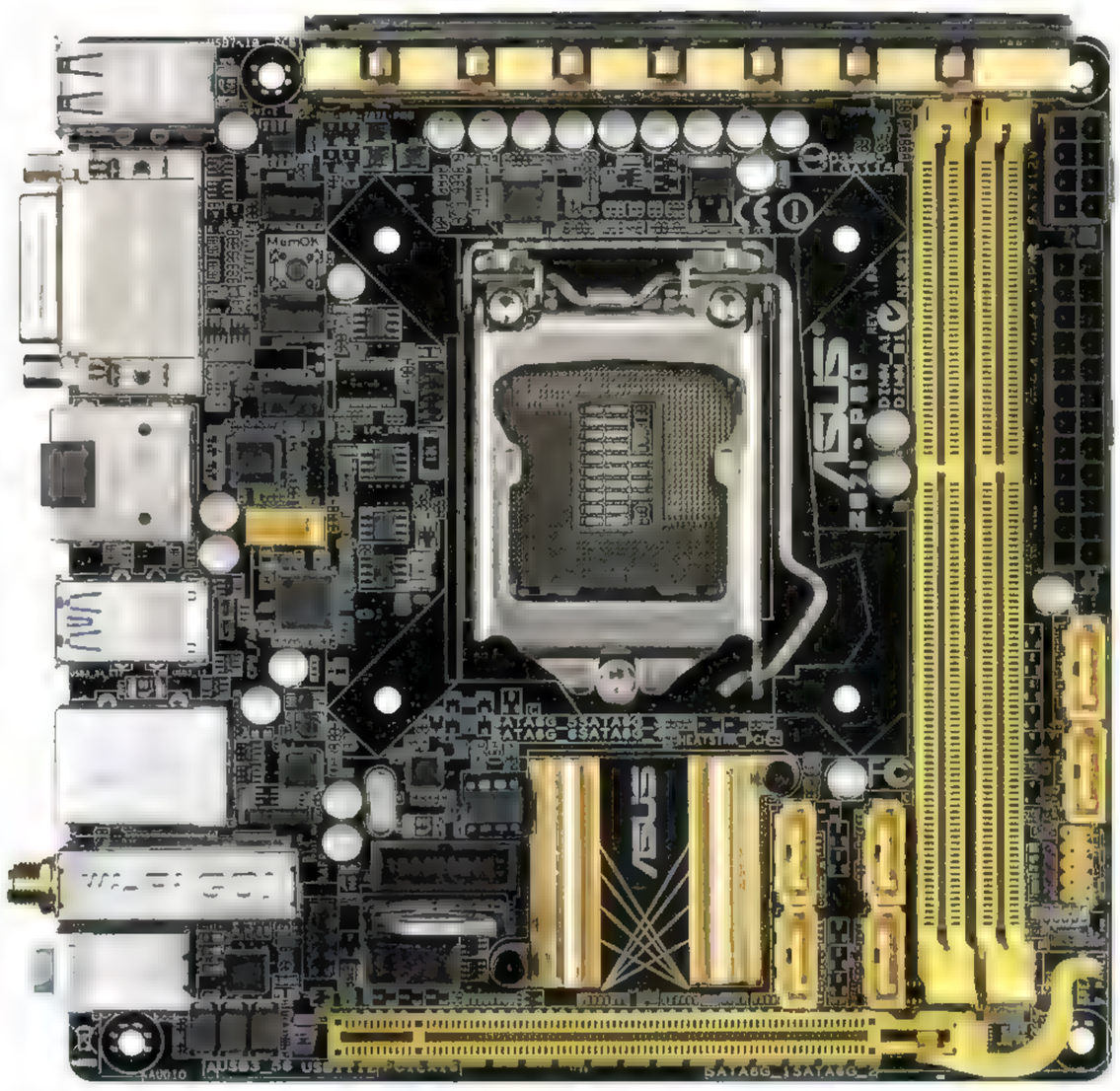


The ability to adjust the vcore to three decimal places saw us running a low 1.175V through the processor, and we set the load line calibration level to three – the same figure as on the ASRock board.

Overclocked performance was understandably less spectacular than its stock performance, but the Z87i-Pro still performed well. Its image editing and video encoding results dropped to second and third in our results table, although its multi-tasking result led the field.

An overall score of 2864 places it third overall, making it the fastest of the boards that peaked at 4.6GHz.

Performance in games again saw the Z87i-Pro pipped by the pair of 4.7GHz capable boards, but the margins remained small. Minimum frame rates of 108fps in Skyrim and 35fps in Shogun 2 are still great results, being just a couple of frames per second behind the quickest.



CONCLUSION

The Asus Z87i-Pro isn't as consistent as the award-winning MSI board thanks to its slightly crowded layout, but it has plenty to recommend it: a visually exciting design, the best EFI of any board on test and great stock speed performance. However, MSI's Z87i is $30 cheaper, overclocks equally well and offers a tidier layout, making it the better board. If the Z87i-Pro's extended set of features fit your needs better, though, it remains a great choice. **MJ**

PERFORMANCE	★★★★★★
FEATURES&DESIGN	★★★★★☆
VALUE FOR MONEY	★★★★☆☆
OVERALL	★★★★★☆

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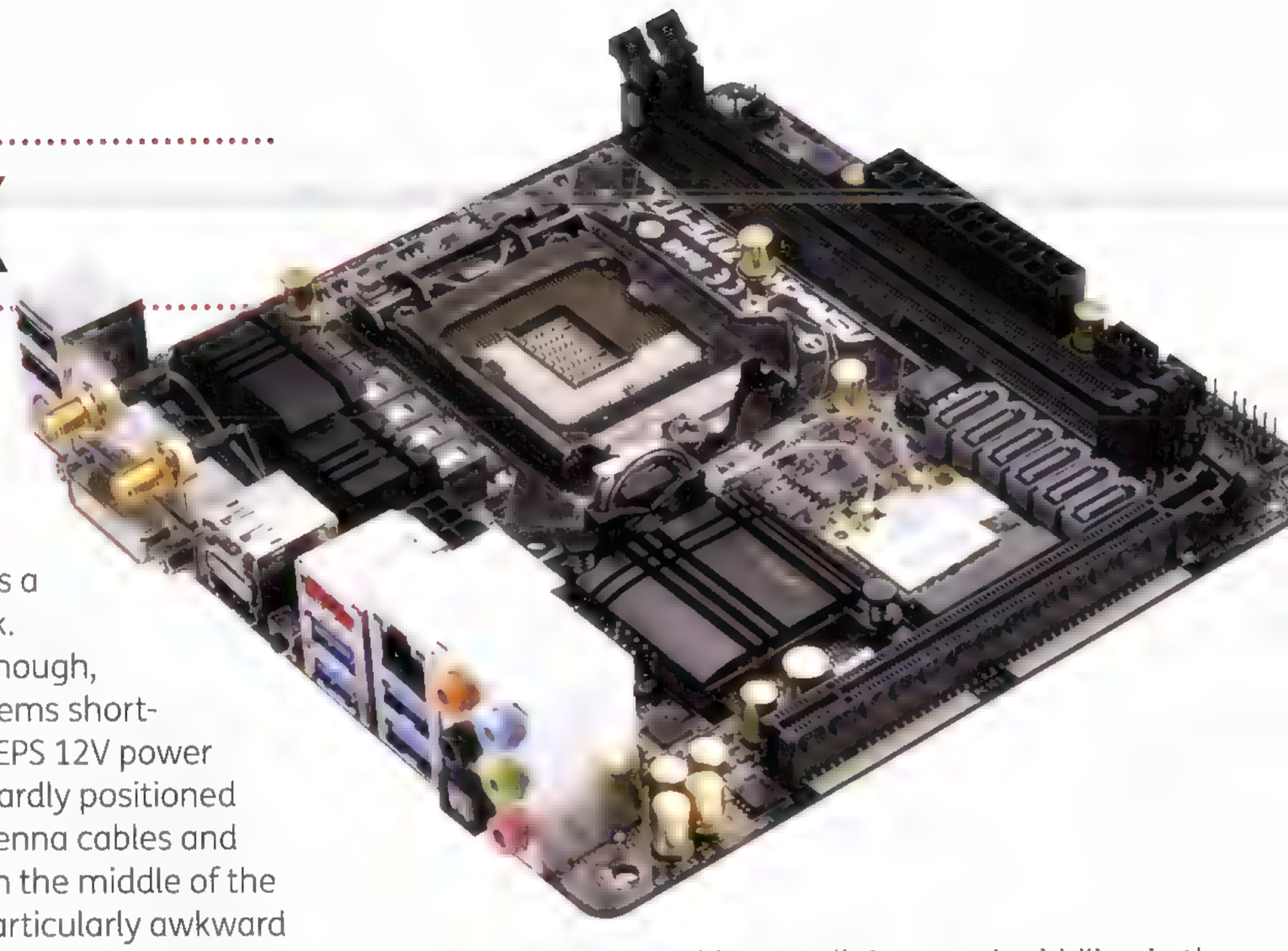

ASRock's Z87E-ITX sits in the middle of the pricing field, but it has some features that u still don't find on more expensive oducts. For starters, it's the only ard on test with a full-sized mSATA ot, rather than a half-height version. is means that the tiny dual-band -Fi card can be removed and placed with an mSATA SSD; you could mpletely dispense with a SATA drive d make a super-tidy build. The Wi-Fi rd is also notable for being the only e on test that's compatible with the ster 802.11ac standard.

The Z87E-ITX also boasts a feature e wish we saw more often: the ility to connect to the Internet d download firmware updates om within the EFI, thanks to built-network drivers. It came in handy ring our testing, and worked rfectly with our connection – it's finitely an advantage over the USB-sed methods used on other boards.

It has an attractive black PCB too; e last month's ASRock Z87-Extreme3, is is dotted with gold capacitors. any of the major components are nsibly laid out, with the CPU socket nd PCI-E slot positioned far enough apart to avoid any conflict, and there's a small VRM heatsink.

In other areas, though, ASRock's design seems short-sighted. The 8-pin EPS 12V power connector is awkwardly positioned between Wi-Fi antenna cables and the VRM heatsink in the middle of the board, making it particularly awkward to connect within the confines of a cramped mini-ITX case. Several front-panel connectors are also jammed behind the rear I/O, and the six SATA 6Gbps ports sit in the middle, and are arranged in a tight line between the PCI-E and DIMM slots. At least the 24-pin ATX power socket, front panel plugs and USB 3 connectors are gathered along one edge.

Looking to the rear I/O, there are HDMI, DisplayPort and DVI outputs, alongside the standard four chipset-based USB 3 ports. The addition of an eSATA port is of note, though, as is the clear-CMOS button – handy if you run into overclocking problems and need to reset the board without taking the system apart.

The Z87E-ITX proved an inconsistent performer in our Media Benchmarks though. Its image editing result of 2031 was the second best on test, but it was second worst in the multi-tasking test and ended up sitting mid-table overall. It proved middling in the Skyrim and Shogun 2 games tests too, with a minimum frame rate of 87fps in Skyrim – 9fps below the Maximus V Impact.

Meanwhile, the EFI is more functional than fashionable, with dated-looking graphics. At least the settings are grouped into sensible blocks, with all the frequency and voltage settings found in the OC Tweaker menu.

The Z87E-ITX was one of just two boards on test to stably overclock to 4.7GHz (47 x 100) too. We managed to hit this magic number by tweaking the vcore to 1.25V and changing the load line calibration to level three.

The Z87E-ITX then redeemed itself with stellar overclocking results. It topped the table in the video encoding test, surpassing even the $340 Maximus VI Impact with a score of 4384, and its overclocked overall score of 2889 was second only to the Impact. Its overclocked pace also took it to the top of the table in the Skyrim benchmark, with a minimum frame rate of 109fps.

CONCLUSION

ASRock's board totes some desirable high-end features and superb overclocking results, but it's hampered by a clumsy board layout. Unless you want to overclock to the max without forking out the premium for the Asus Maximus VI Impact, you'll be better off with the substantially cheaper MSI Z87i. **MJ**

PERFORMANCE	★★★★★★
FEATURES&DESIGN	★★★★☆☆
VALUE FOR MONEY	★★★★★☆
OVERALL	★★★★★☆

GIGABYTE GA-Z87N-WIFI

A GOOD PRICE, BUT IT'S UP AGAINST SERIOUS COMPETITION

PRICE $165
SUPPLIER www.gigabyte.com.au

At $165, the Gigabyte GA-Z87N-WiFi is the cheapest board on test, so it's not surprising that it has a more utilitarian-looking PCB than the Asus boards. The design is a mixed bag, too. It's great that the 24-pin power connector, SATA 6Gbps ports and USB 3 header are arranged along the top edge, for example, as they'll all be easily accessible in a built system.

However, the CPU socket, memory slots and PCI-E slot are clustered very close together in one corner of the board. This makes component installation tricky, and it will be very difficult to install large heatsinks or water-cooling loops when building a system using this board. This is also the only board on test without a VRM heatsink, although there is a heatsink on top of the chipset. There's just a 4-pin EPS12V connector too; however, as we've seen in the past, this isn't necessarily a barrier to performance or overclocking.

There's little on the rear I/O panel to make the board stand out either. There are no enthusiast features, such as reset or clear-CMOS buttons and, as with the MSI Z87i, the inclusion of dual Gigabit LAN remains baffling, as it's a feature few people need. Elsewhere, the GA-Z87N-WiFi firmly establishes its mid-range credentials. It has four SATA 6Gbps ports, rather than six, just two PWM-equipped fan connectors and an mSATA slot that's only half-height, and therefore can't be used for SSDs.

The GA-Z87N-WiFi didn't impress in our Media Benchmarks either. It was bottom of the table in three out of the four tests, with its overall score of 2339 points sitting almost 200 behind the quickest board. It improved a little in games tests, with a 92fps minimum frame rate in Skyrim putting the GA-Z87N-WiFi in third place.

While the EFI has automatic overclocking options, they also proved largely useless thanks to pumping too much voltage through the processor and causing the PC to crash. In our tests, the CPU was only boosted to 4.2GHz but with a whopping 1.417V vcore, quickly causing thermal throttling. Manual overclocking proved much more fruitful, even with the board's lack of VRM cooling and 4-pin EPS12V connector.

Delving into the EFI, we found an attractive, straightforward layout but soon hit problems. Many options are adjusted using fiddly sliding bars that don't work well with the laggy mouse control, and it isn't possible to hit F10 from anywhere. If you want to save your changes and exit, you need to head back to the main screen before exiting, otherwise any changes will be lost. The system also didn't stabilise with manual overclocking at 4.7GHz so, as with most of the boards in this test, we had to drop down to 4.6GHz (46 x 100) with a 1.2V vcore.

The overclock didn't help the Gigabyte to leap up our performance tables, but it remained competitive, with the margins between the fastest and slowest boards remaining slim. It was bottom of the pile in the overclocked image editing and multi-tasking tests, and its overall overclocked result of 2808 was the second lowest on test. Meanwhile, its overclocked minimum frame rates of 104fps in Skyrim and 35fps is Shogun 2 were just a couple of frames per second behind the quickest on test.

CONCLUSION

The GA-Z87N-WiFi has a tempting price, but its tight budget is evident. Some of the connectors are clustered too closely together for comfort, and the EFI is sluggish and difficult to navigate.

Meanwhile, performance is fair but nothing to shout about, with the Gigabyte being eclipsed by both Asus boards but remaining competitive throughout. If you want a board on a budget, the award-winning MSI Z87i is only a touch more costly and better-designed. **MJ**

PERFORMANCE	★★★★★☆
FEATURES&DESIGN	★★★★☆☆
VALUE FOR MONEY	★★★★★★
OVERALL	★★★★★☆

MSI Z87I

NOT THE QUICKEST, BUT IT MATCHES A GREAT DESIGN WITH A LOW PRICE

PRICE $170
SUPPLIER au.msi.com

The MSI Z87i's price of $170 makes it the second cheapest board in this month's test, being exactly half the price of the $340 Asus Maximum VI Impact. For that money, you'd be forgiven for thinking it falls behind its rivals, but this isn't the case.

We were immediately impressed by the MSI's layout. Its four SATA 6Gbps ports, 24-pin ATX power connector and USB 3 connector are all easily accessible along one side of the black PCB.

Other important connectors aren't far away either; the mini PCI-E slot, two USB 2 connectors and one of the board's two PWM-equipped fan connectors are all positioned towards the edge. It's a sensible level of design that we rarely see on mini-ITX motherboards, meaning that a host of common features is easy to reach rather than being buried in the middle of the board.

That packed edge isn't the only impressive aspect of the MSI's design either. Its VRM and chipset cooling is provided by a pair of heatsinks, with only the two Asus boards and their discrete cooling systems able to offer better. The PCI-E and memory slots aren't too close together either, unlike the slots on the two Asus boards, so there won't be any conflict when plugging in parts or troubleshooting them.

It's a good start, but the MSI's design isn't quite perfect. The CPU socket and 16x PCI-E slot are close together, which could cause problems with particular hardware; large graphics cards (such as those with protrusions on the rear like MSI's Lightning models) and CPU coolers could easily clash, and the angle will likely prove too steep to run water-cooling tubing between the CPU and the top edge of a graphics card.

There's also only a 4-pin EPS12V power connector, which is half the size of the sockets on several rivals and situated awkwardly in the middle of the board. As we've seen before, though, a 4-pin power connector is no barrier to overclocking and the slot is at least positioned above the VRM heatsink, unlike the placement of the same connector on the GA-Z87N-WiFi.

Meanwhile, the mini PCI-E slot houses a dual-band 802.11n Wi-Fi card but it's half-height – so the connector can't be used for an mSATA SSD.

Elsewhere, the MSI Z87i board ticks many more boxes. Four SATA 6Gbps sockets will be enough for all but the most ardent file hoarders, and its count of two fan connectors is on a par with most of this month's boards.

"A host of common features is easy to reach, not buried in the middle of the board"

The rear I/O panel is particularly impressive though. The addition of clear-CMOS and Go2BIOS buttons will please overclockers, but there are also four USB 3 ports, two USB 2 ports, a PS/2 connector, optical S/PDIF and two wireless antenna connectors. Meanwhile, display outputs include DVI, HDMI and DisplayPort. There are also two Ethernet connectors.

There's only one EFI chip rather than two, but MSI's EFI software is excellent. Its main page has temperature, version and boot order information, and any changes made to motherboard settings are displayed at the top of the window – a handy inclusion. The menus themselves also follow patterns we're used to seeing on older BIOS systems, which is preferable to hunting around menus for options that have been needlessly moved.

The only notable missing features are on-board power buttons, an LED POST-code display and a discrete audio card, but the only board in this test to fit these options is the Asus Maximus, which is twice the price. Considering the Z87i is the cheapest board on test, it boasts a great array of features that easily match those of the more expensive opposition.

PERFORMANCE

The MSI Z87i doesn't set its stall out as a high-end board, and that's reflected in its benchmark results. At stock speed, it recorded mediocre image editing and video encoding scores, and its overall result of 2343 was 182 points behind the speedy Asus Z87i Pro.

The MSI didn't manage to close the gap in our stock speed gaming benchmarks either. Its 81fps minimum frame rate result in Skyrim was the slowest on test – 13fps behind the Asus – and it also propped up the bottom of the results table in Shogun 2, thanks to a 27fps minimum frame rate that's

1 The four SATA 6Gbps ports, 24-pin ATX power connector and USB 3 connector are all easily accessible along one side of the black PCB

2 The mini PCI-E slot, two USB 2 connectors and one of the board's two PWN-equipped fan connectors are all positioned towards the edge

3 The PCI-E and memory slots aren't too close together either, so there won't be any conflict when plugging in parts or troubleshooting them

2fps slower than the best boards in the Labs.

SATA performance wasn't anything to shout about either. While the MSI's read pace of 536MB/sec was the second-best on test, its write pace of 501MB/sec was at the bottom of the results table, being 19MB/sec behind the rapid Asus Z87i-Pro.

As with three other boards in the Labs, we were unable to overclock the MSI to 4.7GHz, as the system overheated when booted with a vcore of 1.27V and crashed when we dropped the voltage to 1.26V.

We dropped the multiplier to 46x and, after several attempts with lower voltages, the system became stable with the vcore at 1.2V. It took a little time, but MSI's well laid-out EFI made the job easy, providing information about multipliers and temperatures on the main menu, as well as a Hardware Monitor tool that's packed with more information.

The 4.6GHz overclock didn't help the MSI to climb our performance tables, but it was certainly able to compete. While its revised image editing result was second best in this test, it was still second from the bottom in the rest of the Media Benchmarks, and it came bottom of the pile in the overall test with a score of 2779.

While this makes the MSI Z87i the only board on test not to record an overall score of at least 2800 points, its overall result is still less than 5 per cent slower than the Asus Maximus VI Impact.

When overclocked, the MSI Z87i was still bottom of the table in our gaming tests too, but it closed the gap in both The Elder Scrolls V: Skyrim and Shogun 2: Total War. In the former benchmark, it was 9fps behind this month's quickest board, and just 1fps slower in Shogun 2.

CONCLUSION

The MSI Z87i is one of the slowest boards on test, but the margins are slim and, when overclocked, it's only slightly slower than boards costing twice its price. It excels in other areas, though, making up for its lack of raw speed. Easy access to the majority of ports and connectors is aided by an excellent layout, and the rear I/O panel, which is stuffed with ports, as well as a couple of buttons that will appeal to enthusiasts.

The EFI is also responsive and easy to navigate, and proved just as overclockable as most of the other boards on test, having no problems maintaining a 4.6GHz overclock. It's an excellent all-rounder, and it's also the second-cheapest board on test. When a product this good is virtually half the price of some of the competition, we can't help but give the MSI Z87i a Premium Grade. **MJ**

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- IGN

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– Maximum PC

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– Laptop Magazine

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- Mashable

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XBOX ONE HANDS-ON

WE SPEND SOME TIME WITH THE NEW CONSOLE AND SOME OF ITS LAUNCH TITLES

DEVELOPER Microsoft
WEBSITE http://www.xbox.com/en-US/xbox-one/

There's not a lot of light separating the hardware specs of the two upcoming major console releases. Both the PS4 and the lovingly nicknamed Xbone are essentially black box PCs, using the same hardware you and I have been using in our desktops and gaming boxes for years. The PS4 boasts GDDR5 RAM over the Xbox's DDR 3, but both have 8GB of it, and an eight-core x86 processor. The Xbox has the edge in processor speed, however, clocking in at 1.75GHz, and enjoys a similar advantage in GPU speed.

But really, they're more or less identical. Massive hard drive space, Blu-ray player... it's all there.

What's going to really separate the machines at launch is the software capabilities, motion control schemes, and – of course – the games available.

SOFTWARE

The Xbox One is aiming to be the centre of your home entertainment universe. How many media services will be available outside the US is still a little woolly, but even the basic picture in picture capability, and the snap-to multi-screen functionality – very much taken from Windows 8, along with Metro-styled tiles and all – is pretty handy. Xbox Live functionality is vastly expanded, including more social options and the ability to have up to 1000 friends in your list, on top of being able to passively follow people like sports stars and celebrities.

If that is your sort of thing.

SmartGlass is also fully integrated, for mobile and tablet functionality, such as setting up multiplayer games. Perhaps the most useful thing for gamers who like to show off is built-in TwitchTV and the ability to instantly share the last five minutes of any game. Get a good kill in Halo? You can edit and share it in moments, with barely an interruption in your pwning.

KINECT

The idea of motion controlling a game, or even talking and waving at your console to control a film, has never really appealed, but even we have to admit the fidelity of the new Kinect unit is amazing. It can read your face in remarkable detail, and now works in much larger rooms, too. It reads emotions, whether or not your eyes are closed, where your furniture ends and you start... it's really impressive. The 1080p sensor really makes a difference.

It can also track the full skeletal movements of up to six people, making party games even bigger. There aren't a lot of games making full use of this at the moment, but when they start to roll out, we can't wait to see what they make of the new Kinect.

CONTROLLER

It's pretty much all evolution when it comes to the new controller. The D-pad now uses a four-way design, and the battery is slimmer, but it still sits wonderfully in the hand, with all keys and buttons pretty easy to reach.

The biggest addition here is that the triggers now vibrate. It seems a bit

SPECS

8 Core x86 AMD CPU · 8 GB System Memory · 500 GB HDD · Blu-ray Drive · 802.11n Wireless with Wi-Fi direct · Gigabit Ethernet · HDMI in/Out · 1080p · 4K support · Optical out

of a gimmick, but when you're racing – and using those triggers to break and accelerate – the feedback makes a world of a difference. The built-in 'impulse triggers' can also be set to vibrate directionally, so that taken together the variance in vibration can indicate the direction from which you're being shot – in an FPS, for instance. Pretty much every game we played was vastly improved by this inclusion.

WORTH IT?

At the end of the day, while it's likely we're going to end up with both consoles despite ourselves, if we were held down to only choosing one, it'd likely be Microsoft's Xbox One. On top of the hardware, it features – for us – the best selection of games, and it's even starting to get some free-to-play development happening on the platform. But on the strength of what the hardware has to offer, and if you only want one console in your life, this is our choice.

David Hollingworth

PERFORMANCE	★★★★★
FEATURES & DESIGN	★★★★★★
VALUE FOR MONEY	★★★★★
RATING	★★★★★★

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THE WOLF AMONG US

A DARK, TWISTED SPIN ON THE WORLD OF FABLES MAKES AN UNLIKELY SUCCESSOR TO ONE OF LAST YEAR'S BIGGEST GAMES

DEVELOPER Telltale Games
PUBLISHER Telltale Games
WEBSITE www.telltalegames.com/thewolfamongus

PLATFORMS
PC • Xbox 360 • PS3 • reviewed on PC

Last year Telltale games hit the big time with its episodic Walking Dead title, regarded by many as one of the finest pieces of storytelling in years. Part adventure game, part interactive fiction, it drew from years of experience with more niche titles (and some mediocre stabs at popular IP) and combined it with one of the most popular franchises of recent years.

A follow up to this tale of life post-zombie apocalypse is coming later this year, but for now Telltale is delivering a brand new product, based upon a comic series called Fables. Given that name is well and truly locked down by another game developer, Telltale has instead gone with the title The Wolf Among Us, which refers to the protagonist, Bigby Wolf.

As one may guess from the comic series naming, the premise of the game is that fictitious characters are real, living in New York and hidden from sight by magical spells called Glamours. As his name suggests, Bigby Wolf is actually the Big Bad Wolf, responsible for both the Little Red Riding Hood incident and a nasty case of huffy, puffy destruction of piggy residences. He is now reformed, acting as the Sheriff of Fabletown, as the community in which the game is set is nicknamed.

The Wolf Among Us is being delivered in five episodic chunks, the first of which, titled Faith, has been recently released (it is this first episode that our review is based upon). It can be purchased bit by bit or as an entire series in which you will receive new episodes as they are completed. As is the nature with episodic titles, your saves transfer to each new chunk of gameplay, and decisions made along the way will act to shape the entire story. This was key to the success of The Walking Dead, which proved spectacularly that Telltale's approach to episodic content can succeed where other attempts have failed.

Telltale has gone to great lengths to ensure that the game is approachable to those unfamiliar with the comics (such as this writer). It's designed as a prequel to the comics, and at no point does it make you feel like you need prior knowledge. Apart from characters that are obviously designed to be mysterious, the origins of most of the characters becomes quickly apparent. Roles are turned on their head, as an early encounter with the Woodsman, hero of the little Red Riding Hood tale, makes quite apparent.

Gameplay is quite similar to that of The Walking Dead, though this time around the action sequences feel slightly more complex. These play out as quicktime events, and while that will be an instant turnoff for some gamers, such a means of control feels a lot more natural in a slow paced title like the Wolf Among Us than they do in more action focused games. These sequences form the major setpieces in the game, while the rest of the game revolves around adventure-style exploration and a conversation design that gives multiple options of reply and a strict time limit in which to respond.

This conversation design is one of the things that made The Walking Dead so memorable, forcing one into making snap decisions that often had major repercussions down the line. Much like the Walking Dead, The Wolf Among Us conveys a feeling that you are actively influencing the tale with these decisions, shaping Bigby's journey through the game.

One thing to keep in mind is that the game very much earns its MA15+ rating. It has a very adult sensibility, the dialogue can get quite sweary, and the violence quite brutal and confronting. The murder investigation around which this first episode is set layers adult theme on adult theme, and just because the characters can be seen as originating from children's stories doesn't mean this is a game suitable for kids.

Yet again Telltale has delivered a very different gaming experience, but one that is both visually rich and enormously satisfying. Playing these kinds of games episode by episode ensures that the relatively simple nature of the gameplay doesn't get old, and the storytelling is strong enough to leave you hankering for more. It makes for a thoroughly enjoying palette cleanser during that phase of the gaming year when everything seems to be about twitch reactions and parkour-action-stealth-explodey gameplay.

John Gillooly

atomic

RATING ★★★★★½

GRAND THEFT AUTO V

A DAZZLING DISPLAY OF MECHANICS AND WORLD BUILDING, BUT SOME FLAWS DO GET IN THE WAY

DEVELOPER Rockstar
PUBLISHER Rockstar
WEBSITE www.rockstargames.com/V

PC · Xbox 360 · PS3 · reviewed on Xbox 360

There are some games where it's almost impossible to really get into a good reviewing space. They're big, they're brash, and working in print, by the time you get to them, they've already made a billion bucks at retail.

So, you know, actually talking about them seems... not quite pointless, but certainly a little after the fact. Nonetheless, it can be a boon to not have to rush a review. And Grand Theft Auto V is most certainly not a game to be rushed. To call it sprawling, epic, and insanely detailed is doing it a disservice.

But it's not a greater disservice than the game manages to do to itself, with some more than challenging characters and a dedication to its mainstream fans that makes it seem at times almost impenetrable.

Where to start...

CITY OF SIN

There is no doubt that Grand Theft Auto V is one of the great achievements of game design. No sandbox city has ever felt quite so fully realised, so alive with characters that it seems to have a rhythm and life all its own, even when you're not logged on. As a recreation of Los Angeles by another name it is almost note perfect, even to people who know the city well – from the Venice Beach-inspired waterfront, to the game's iteration of Downtown Hollywood and more, you can almost feel the dry heat and the lingering smell of oranges that characterises the City of Angels.

However, it's a *broken* mirror to that city.

Every vice, every sin, and every foible of a city of that scale is turned up to eleven in GTAV. Billboards are brutal in their spitting of fashion archetypes, often to the point of – I'd say, at least – crossing a line of good taste, and the venal inhabitants of the city all seem to be on the take. From the named NPCs you meet, to the average Joes and Janes on the street, everyone wants something.

And they're willing to go to some incredible lengths to get it. Ultimately, it's not a nice place. It is very pretty though, and on Xbox 360 at least it's stunning the amount of visual fidelity Rockstar's gotten out of the ageing hardware. At all times of day and night, GTAV is nothing less than breathtaking to look at, and the attention to detail in the environment, from water effects to bullet damage and even clothing, just adds to the feel of almost reality on show.

In many previous games, you'd spend hours going on random rampages, just racking up kills and seeing how much of the police force you could get chasing you – now, I'm spending time just exploring.

That's when I'm not working my

way through the story, which manages to soar between all manner of tones – some gripping, some downright hilarious, and others... a little more difficult to get a grip on.

THREE KINGS

GTAV eschews the single character of previous Rockstar games, and instead gives you three career criminals to explore. There's the young kid, Franklin, just coming up in the world of crime; the seasoned vet, Michael, the heist pro who's trying to settle down with a family he can't stand; and the insanely over the top – and insane – Trevor, an old partner of Michael's who's currently cooking meth and taking care of business with guns and bombs out in the desert.

Each character comes with a single unique skill that focuses on their strengths. Franklin, for instance, is a driver, so his skill lets you slow down time while in a car, which is handy for dealing with some of the more insane car antics. There are other skills, too, from swimming to running and shooting, all of which can be levelled by essentially grinding away at them. Some, like basic driving and shooting, will easily level up as you play normally, while others really need to be worked at.

"You can spend entire game sessions avoiding the main plot..."

The story weaves these three characters together as a team, letting you switch between them at some times, and at other times forcing you dramatically from one character to another. The story is classic Rockstar, as the three pursue ever-greater heists while dealing with double-dealing FBI agents and... you get the picture. There are a couple of branching choices, but otherwise the story's pretty much on rails. You can of course take it at your own pace, and if you prefer one character over another you can spend more time with them, but you'll be forced to spend a minimum amount of time with each one.

Meanwhile, Los Santos is packed with distractions. There are mini-games for everything, from skydiving to buggy races to tennis, and the list goes on. You can spend entire game sessions avoiding the main plot, either enjoying a game of golf or even sticking up random shops and banks outside of the game's excellent set-piece heists. The wealth of gameplay and mechanics is stunning.

And this is all without GTA Online, which only went live while we were writing our review – that's a completely separate version of the offline city that you can share with 16 friends, and with a level of persistence when it comes to money and housing. There's a lot of game in GTAV.

But there are more than a few flaws as well. There's a distinct boy's club feel to the game that can get very uncomfortable at times, and it really wouldn't have hurt Rockstar to have a few female characters with actual agency and power.

But possibly the greatest issue with the game is how the very serious tone of Franklin's and Michael's stories just don't quite match up to the insanity of Rockstar's hyper gameplay. Trevor, as uncomfortable as he can be to play, makes much more sense as a Rockstar character. It's this clash between tone that can sometimes derail the game's seamless sense of progression and place.

Well, at least for a little while. GTA remains as compelling as ever, even if some of its tropes are starting to wear a little thin.

David Hollingworth

atomic — A truly compelling world and a wide array of gameplay almost make up for some uneven writing.

RATING ★★★★★☆

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Optimised for multimedia processing, the new DS214play fulfills your needs for high-quality photo, music and video streaming, while keeping all other aspects of NAS uncompromised. It features 1080p full HD video transcoding on the fly to let you watch HD movies smoothly via DLNA and AirPlay. Running DSM 4.3, the DS214play is your versatile and easy-to-use private cloud, where you can access data from anywhere.

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WAR OF THE VIKINGS PREVIEW

THE NEW GAME FROM THE MAKERS OF WAR OF THE ROSES IS AVAILABLE NOW IN STEAM EARLY ACCESS, AND WE GIVE IT A SPIN

DEVELOPER Fat Shark
PUBLISHER Paradox Interactive
WEBSITE www.warofthevikings.com

Ah, Vikings. Boiling out of Northern Europe in the late 8th century AD, Nordic explorers and raiders spread runes and long, golden hair from Dublin to Constantinople. They traded, they slaved, they drank a lot, and in some places settled permanent Viking colonies. Throughout the UK and Europe there are placenames and entire bloodlines that last to this day, all taken from the time of the Northmen.

Given the unique mix of violence and culture that the Vikings exhibited, they're perfect fodder for games, and that's exactly what's inspired Fat Shark to focus on the Viking (and Saxon) Age for its latest game, War of the Vikings.

It's not in full release yet, but after a couple of Alphas it's available via Steam's Early Access program. It's only $20 or so, and you currently only have access to a cutdown version of the final game, but if you liked Fat Shark's War of the Roses it's worth putting your stamp on the game's ongoing development – though with one big caveat.

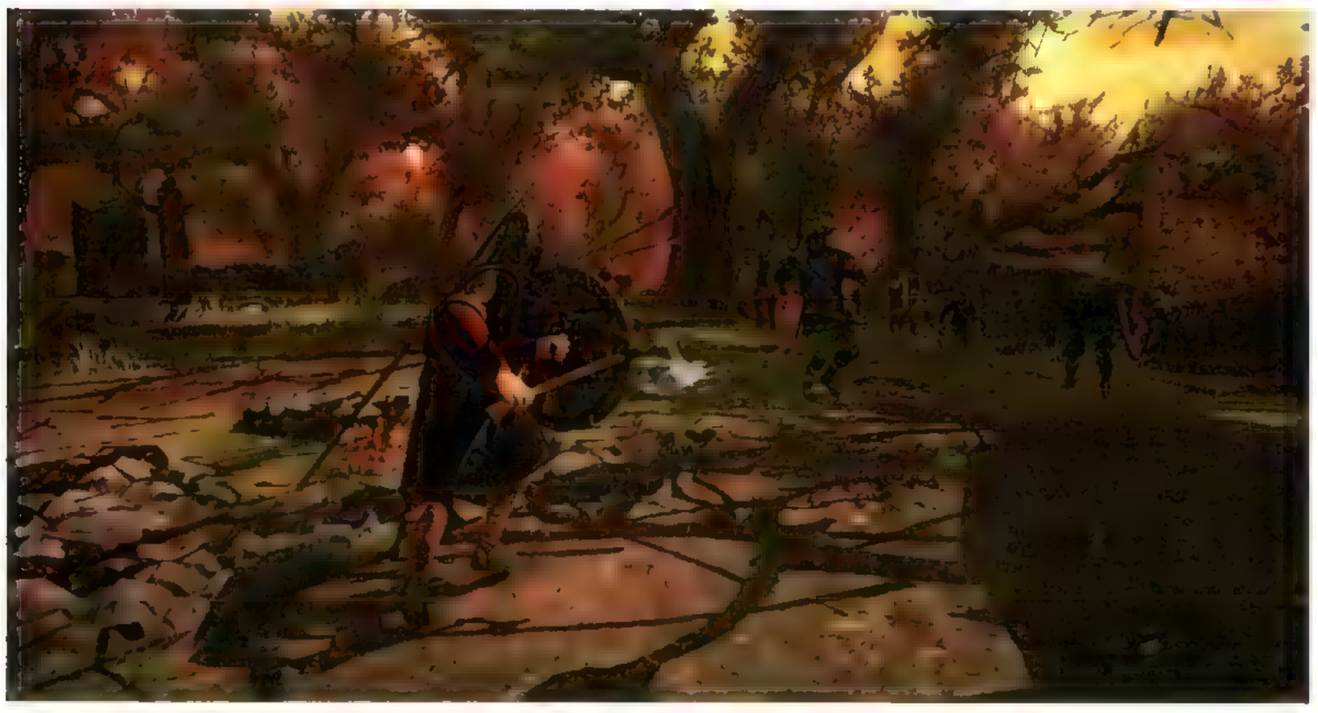
Being a limited release, there are of course limited numbers of players, and we have to admit that the already niche area of online multiplayer melee games is made even more niche by coats of mail, great-axes, and shield-walls. And because of that, local, Australian servers are as rare as Odin's handmaidens, the mythical Valkyries. Instead we've played mostly on US servers, with a rather harsh 300+ ping.

And it makes a close-in, timing-critical game like War of the Vikings more than a little problematic. But you can certainly see what the developers are aiming for.

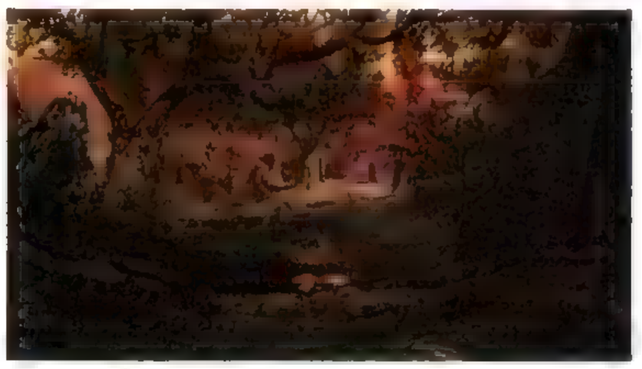
The combat in War of the Vikings is a little lighter, and a little faster, than War of the Roses, which makes a lot of sense, given the lack of plate armour for the combatants. You still have the typical light, medium, and heavy choices of infantry, with the heavies sporting massive double-handed axes that pack a punch but swing rather slowly, and the lighter troops being armed with one-handed axes and bows. The mediums sport a sword and shield, offering possibly the best defensive options, provided you can time your shield blocks properly.

All attacks and blocks are triggered by either a mouse click or holding the mouse button down, and angling your mouse in the attack direction you want. It's a little fiddly, but very effective once you get used to it. There's a hint of rock-paper-scissors to the set-up, but any skilled player should always be able to handle any other class. Two shield-armed warriors can really just whale away on each other, while watching two axemen circle each other is quite engrossing. And getting behind a line of archers without them noticing is truly its own reward, as their lack of armour makes for some real mayhem once you start hacking away.

There are limited maps, and you're not getting the full range of gear or game modes, but it's certainly a great alternative to cookie-cutter shooters if you're looking for competitive gaming.



PLATFORMS
PC



And it looks marvellous – the armour textures are wonderfully designed, and the costuming remarkably accurate. The maps are a little over the top, perhaps, all standing stones and moody cliffs, but make for some varied gameplay experiences.

If you'd rather wait for the full product, that makes perfect sense, but Early Access is a great way to get in now and help shape the game. Just be warned that until some local servers start up, your mileage will vary – as will your ping.

David Hollingworth

EARLY ACCESS

Early Access makes the review/preview process a little challenging. As a rule, if we're playing and writing about a game before its release, it's a preview, and doesn't get a score. If the game's out and available for purchase, we score it. So, a game you can buy, but that's not complete... that's a challenge.

Any Early Access game will change between its Early release, and its reaching a 'finished' state. With that in mind, any score or rating will quickly become irrelevant as new features are added or improved. But the fact that a developer is expecting you to pony up cash suggests that we should be scoring these games, incomplete as they are. So, for now, that's our justification for treating Early Access games as full release titles.

If you've any thoughts on this, we'd love to hear them – *dhollingworth@atomicmpc.com.au*

atomic [illegible]

RATING ★★★★☆☆

F1 2013

HAS CODEMASTERS FINALLY GOTTEN THE RACING LINE JUST RIGHT?

DEVELOPER Codemasters
PUBLISHER Codemasters
WEBSITE www.formula1-game.com/

PLATFORMS
PC · Xbox 360 · PS3 · reviewed on PC

Yes. If you already own F1 2012 (or 2011 or 2010), you should still buy this. No, it doesn't look much better. No, there are no new current season tracks (unless you count the return of Nurburgring). And no, there are no exciting 'new ways' to play the game.

Yes, the inclusion of the 'Classic' era cars and tracks is a nice bit of fun, but there's just not enough of that to warrant plonking down some dollars. No, where it matters is quite simply the massively improved car dynamics. For this is a racing game, and it's how the cars feel and behave which ultimately matters, and Codemasters has finally nailed that.

It's almost a fusion of the best qualities of every previous game. The nimble responsiveness of 2010 with a dose of the oversteery front end of 2011, topped off with 2012's predictable car feel. 2012 faced huge and unending criticism of the handling, with an understeering front end that just didn't want to turn in. Now, the front is beautifully twitchy with slight oversteer tendencies, while the rear just loves to squirm under acceleration.

It makes for a car that is immense fun to drive, but most of all it's intuitive. This is the holy grail of racing games. To have a car that makes sense, eliminating the brain filter we needed before that to translate what we wanted to do into doing it on Codemaster's terms. Now, the car responds exactly as you would expect

through every turn. You can now take those tricky turns in that lovely way you visualise on the approach, without the game's physics causing a different outcome.

You will need to be far more precise with your accelerator on exits, applying maximum gas without slipping the rear, but when the tail does dance it's all so perfectly balanced that powerslides can safely be executed and catching a loss is pure instinct. You can even purposely give the tail a little flick through hairpins with a squirt of gas. So much fun!

It's beautiful. If you come off the track it'll be your own fault for overcooking it. In races this all means far fewer incidents and much closer racing, though that's not to say it's easy to drive – it certainly isn't – and that's great because there's a lot of headroom to extract more speed.

The only little oddity that feels a bit off is a lack of weight transfer when transitioning from braking to acceleration through a turn. It's possible to pulse the pedals on and off through a turn without upsetting the car's balance, but it's equally possible to brake into the apex hard then nail the exit perfectly in one smooth sweep.

The lovely handling is complimented with tire physics that are light years better than the previous games. The old games had appallingly bad tyre modelling, so bad that it was debatably the single worst thing about them. Now, though, wear is actually beautifully progressive – and brutal once you hit the cliff. Now you really will have to drive to preserve the tyres, and be absolutely on top of your pit stop strategy.

"This makes for a car that is immensa fun to drive, but most of all it's intuitive."

Wet tyres are now actually driveable on a dry track, though poorly and with fast wear, opening up fantastic strategic possibilities in changing weather.

Tyre wear scales, a feature removed from F1 2012, so on a 25% race, for example, your options may only be good for 4-5 laps. This is beyond fantastic and is a game changer, adding so much depth to racing.

Other improvements that matter include a more detailed soundscape, with ultra-cool mechanical and road noises erupting around you. On the flipside, the distinct note of your own engine too easily gets lost amid heavy traffic which affects your understanding of what the car may be doing at a critical moment.

The AI has finally grown some balls and won't concede a corner just because you are nearby. They fight, they fail sometimes, and they act human. Unfortunately it's still too easy to beat them even on the highest difficulty, but average players will see a proper challenge.

The Classic cars are a lot of fun, with the turbo cars in particular very challenging, but charging as DLC is mercenary and rude, and the basic game without them is still going to satisfy you.

It's taken four attempts but Codemasters has finally got it right.

Ben Mansill

atomic

RATING ★★★★★½

THE A-LIST

ONLY THE BEST OF THE BEST MAKE IT TO *PC & TECH AUTHORITY*'S A-LIST

Our A-List contains a collection of the best products to pass through our testing labs in recent times. We've revamped and trimmed down the previous list, and updated some of the out of date products. You'll also find that we have incorporated the Atomic Kitlog, replacing the old collection of components on the A-List with two potential system builds, a reasonably priced all-rounder and the bleeding-edge perfect PC.

Another thing we have done is to step away from adding pricing to categories like software. Given the amount of fluctuation that we see from month to month, it is worth searching out pricing for yourself. We personally use the price aggregators **www.staticice.com.au** and **www.shopbot.com.au** but there are a myriad other options that will give you current pricing for tech items, pricing that will be a lot more timely than anything we supply.

ALSO RECOMMENDED

ADOBE LIGHTROOM 5

★★★★★½

We have a look at the beta of this new release this issue, and we've found it to be an even more essential suite for photographers of any stripe. However, as the beta is all that's available, we've left Lightroom 4 listed here in the A-List for this issue. But if you're at all curious, check it out for yourself!

PCS DESKTOPS

HIGH-END TI DELUXE 4670K

★★★★★

PRICE $1885 **SUPPLIER** www.ticomputers.com.au

With an overclocked Core i5 CPU boosted up to 4.2GHz, and a speedy GeForce GTX 770, this is a great system for anything you could throw at it.

SPECIFICATIONS Core i5-4670K @ 4.2GHz · ASUS Z87-A · 16GB DDR3 · 2GB GeForce GTX 770 · 120GB HDD · 2TB 7200rpm HDD · 750W PSU · Blu-ray combo drive. **WEB ID** N/A

GAMING SCORPTEC THERMALTAKE GTX 760 PC

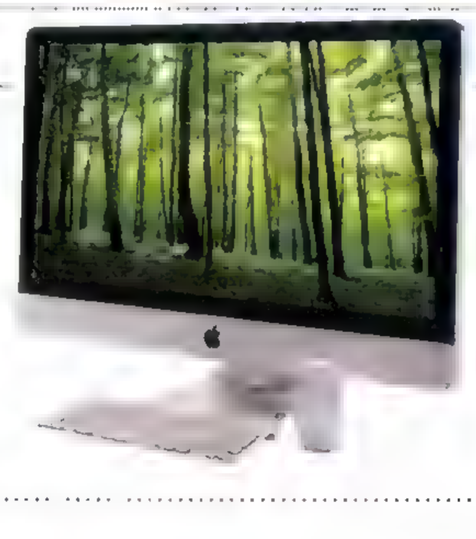
★★★★½

PRICE $1499 **SUPPLIER** www.scorptec.com.au

This Haswell-based PC strikes a great balance between gaming grunt and cost effectiveness – a great all rounder.

SPECIFICATIONS Intel Core i5-4570; 8GB DDR3 RAM; 120GB SSD; 1TB 7200rpm HDD; DVD-RW; NVIDIA GeForce GTX 760; Thermaltake Chaser A31 case **WEB ID** N/A

ALL-IN-ONE APPLE IMAC 27IN



★★★★½

PRICE $1949 **SUPPLIER** www.apple.com/au

If you can afford it, the 27in iMac is the finest piece of all-in-one engineering on the market. A truly powerful beast with performance to match its looks.

SPECIFICATIONS 2.7GHz Core i5-2500s; 4GB DDR3 RAM; 1TB Western Digital Caviar Black HDD; DVD writer; AMD Radeon HD 6770M graphics; 27in 2560 x 1440 LCD. **WEB ID** N/A

HANDHELDS

SMARTPHONE HTC ONE

★★★★★

PRICE Varies **SUPPLIER** www.htc.com

The first of the next generation superphones has landed, and HTC has delivered a truly excellent handset, packed with potential.

SPECIFICATIONS 1.7GHz Krait CPU; 32GB internal memory; 4.7in 1920x1080 sLCD3 screen; 4MP camera; 137.4 x 68.2 x 9.3 mm 143g

TABLET PC APPLE IPAD

★★★★★

PRICE $539 **SUPPLIER** store.apple.com/au

Despite the "4G" debacle, the new iPad remains the one to beat, with the new retina screen a real game-changer.

SPECIFICATIONS 9.7in 1536x2560 widescreen Multi-Touch display; 1GHz A5X processor, 16, 32 or 64 GB available; 3G and/or Wi-Fi connectivity; max 652g weight. WEB ID N/A

EBOOK READER KINDLE

★★★★★★

PRICE $109 **SUPPLIER** www.amazon.com

The new model is quicker, slimmer, lighter and cheaper than before. If all you want to do is read books, its simple design and performance are perfect.

SPECIFICATIONS 6in e-Ink screen, 170g weight, 114 × 8.7 × 166 mm, 2GB memory, 10-day battery life . WEB ID 279534

PCS LAPTOPS

VALUE ASUS X202E

★★★★★

PRICE $699 SUPPLIER www.asus.com.au

This touch-enabled Windows 8 laptop may not technically qualify as an Ultrabook, but it comes pretty close, and combines decent performance with a slick design for an excellent price.

SPECIFICATIONS Intel Core i3-3217U; 4GB DDR3; 500GB HDD; 11.6in 1366x768 Touch LCD; Wi-Fi; Ethernet; HDMI.

HIGH-END LENOVO THINKPAD X1 CARBON

★★★★★

PRICE $2127 SUPPLIER www.lenovo.com/au

We've been waiting a long time for a truly modern ThinkPad, and the X1 Carbon does not disappoint. It is powerful, very well-engineered, and looks the part.

SPECIFICATIONS 1.8GHz Intel Core i5-3427U · 8GB RAM · 128GB SSD · 14in 1600 x 900 LCD · 1 x USB 3 · 1 x USB 2 · dual-band 802.11abgn Wi-Fi · Bluetooth 4 · 3G · 3yr RTB warranty · 331 x 226 x 19mm (WDH) · 1.36kg. **WEB ID** N/A

GAMING VENOM BLACKBOOK 17

★★★★★

PRICE $3199 SUPPLIER venomcomputers.com.au

Packed with powerful components, and featuring some of the best quality video and audio we have encountered, this is a true gaming powerhouse.

SPECIFICATIONS 2.2GHz Core i7-3630QM; 4GB Nvidia GTX 680M, 16GB DDR3; 1920 x 1080 17.3in screen; 1GB HDD + 256 GB SSD; 802.11a/g/n; USB 3.

ULTRA PORTABLE DELL XPS 13

★★★★★

PRICE $1899 SUPPLIER www.dell.com.au

Our previous favourite Ultrabook achieves perfection, thanks to an update to Ivy Bridge and the inclusion of a gorgeous Full HD 1080p screen.

SPECIFICATIONS 2.50GHz Intel Core i7-3537U; 8GB DDR3; 256GB SSD; 802.11n; Bluetooth 4; 13in 1920 x 1080 screen

PERIPHERALS

WIRELESS ROUTER ASUS DSL-N55U

★★★★★

SUPPLIER www.asus.com.au

A high-speed router that looks striking and delivers everyithing you could want for home connectivity

SPECIFICATIONS 802.11abgn wireless router; 4 x Gigabit Ethernet ports; 2 x USB; PPOE; PPTP; L2TP; 145x63x174mm.

DESKTOP STORAGE SEAGATE 2TB BACKUP PLUS DESKTOP

★★★★★★

SUPPLIER www.seagate.com

This 2TB external drive still offers good value despite the rise of higher capacity drives. The USB 3.0 adaptor makes for excellent transfer speeds and the design is tasteful and compact.

SPECIFICATIONS 2TB external hard disk with NTFS; USB 3.0, with other docks available as optional; 44 x 124 x 158mm 894g.

NAS BUFFALO CLOUDSTATION 2TB

★★★★★★

SUPPLIER www.buffalotech.com

Remarkably easy to set up, the Cloudstation features support for the highly functional Pogoplug smartphone app, letting you access all your stored data remotely – a great product for the price.

SPECIFICATIONS Gigabit Ethernet; Android and iOS apps; 45 x150 x 175mm; persistent Internet connection required .

ALL-IN-ONE PRINTER CANON PIXMA MG5460

★★★★★

SUPPLIER www.canon.com.au

The winner of our most recent printer grouptest, this combines excellent print quality with decent costs.

SPECIFICATIONS 9600 x 2400dpi print; 2400 x 4800ppi scan; USB; 802.11n WLAN; 125-sheet tray; 455 x 369 x 148mm

LASER PRINTER DELL B1160W

★★★★★★

SUPPLIER www.dell.com.au

The best all-rounder in our printer grouptest, with excellent text printing and decent costs.

SPECIFICATIONS 1800 x 600dpi resolution; USB 2; Wi-Fi; 150-sheet input trays; 331 x 215 x 178

SOFTWARE

SECURITY BITDEFENDER INTERNET SECURITY 2013

★★★★★★

SUPPLIER www.bitdefender.com.au

The winner of our annual security software grouptest, coping better with virus cleanup and malware detection than the competition.

BACK UP ACRONIS TRUE IMAGE 2013

★★★★★

SUPPLIER www.acronis.com.au

A clear and well-organised front end makes this easier to use than ever. Not much has changed from previous years, but it remains our go-to backup solution.

OFFICE SUITE MICROSOFT OFFICE 2013

★★★★★

SUPPLIER www.microsoft.com.au

Amidst new touch features, there are some fantastic new additions to the latest office.

WEB DEV ADOBE DREAMWEAVER CS5

★★★★★

SUPPLIER www.adobe.com.au

This edition makes PHP and CMS its core focus, which gives it the new lease of life it so desperately needed.

AUDIO CUBASE 6

★★★★★

SUPPLIER www.steinberg.net

The addition of better tools for live recording pushes this program to new heights and gives it a well-deserved place on the A-List.

VIDEO SONY VEGAS MOVIE STUDIO HD PLATINUM 10

★★★★★

SUPPLIER www.sony.com.au

May not have the bells and whistles of other consumer editing packages, but its tools are efficient.

PHOTO ADOBE PHOTOSHOP LIGHTROOM 4

★★★★★

SUPPLIER www.adobe.com.au

An excellent tool for photo management and light editing, now available at a very reasonable price.

KITLOG

These are two basic systems, with something for every taste. The Game Box is put together with money saving in mind, but also an eye to getting as much bang for your buck as possible. Our build may be a little more expensive than what you could technically get away with, but for that extra few hundred you're also getting cutting edge performance and one of the most overclockable chips you can get today.

The Perfect PC, on the other hand, is the system everyone aspires to, with nothing but the best parts - without going crazy, though. It's a collection of all the greatest hardware that we'd pick without a budget, sure to impress with performance and sheer style.

Whether you choose to go specifically for these builds or use them as a baseline to work on, you'll find that these are the best components and peripherals that we have encountered in recent times. As with our A-List, it is worth checking out price aggregator websites to get the best deal on components, with some parts like RAM and hard drives renowned for varying on an almost daily basis due to market factors.

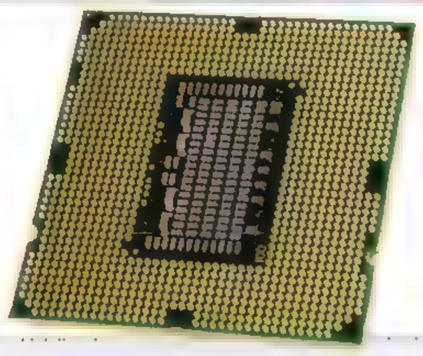
One thing to keep in mind if you are choosing to build your own PC: you'll need to add the cost of a copy of Windows onto the overall price. At the time of writing, this was around $150 for an OEM 64-Bit copy of Windows 8. We also don't include optical drives. If you need an optical drive we suggest going for a USB model, which can perform double duty with Ultrabooks and other laptops, rather than being stuck inside your PC.

NOW PLAYING

There are some games we come back to time after time, and it's worth calling out these stalwarts of our true, non-reviewing game time. World of Tanks got itself a Hot Award when we first reviewed it, and with update-after-update the game maintains a true example of free-to-play done right (especially compared to this month's Neverwinter). With hundreds of tanks, even more equipment options, and RPG-lite mechanisms for training and improving your crew, it's a real one-more-round kind of game. And it really can be enjoyed quite free, though spending a few dollars can really boost your enjoyment. If you like it, check out our WoT community in the Gaming section of the Atomic forums: **forums.atomicmpc.com.au**!

THE GAME BOX

CPU

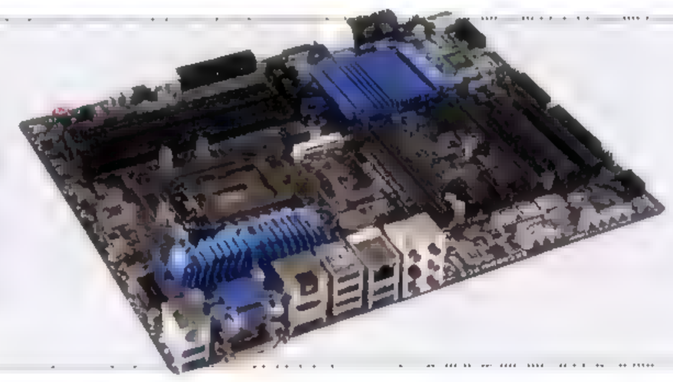


INTEL CORE I5 3570K

PRICE $245

Remove the Hyper Threading, and save $150? DEAL! You can always opt for a non-K version CPU if overclocking isn't your thing.

MOTHERBOARD

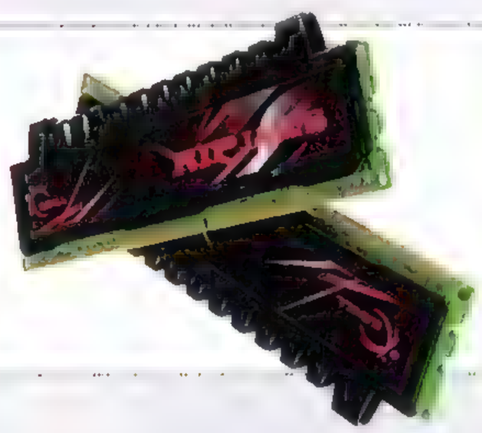


GIGABYTE Z77X-UD3H

PRICE $185

Affordable gaming performance and features, without the overkill seen with a lot of gaming-specific motherboards on the market.

MEMORY



G.SKILL RIPJAWS F3-12800CL9D-8GBXL

PRICE $55

Great value, decent perfomance, and some flexibility. RAM is universally cheap now, so higher capacities are still viable for budget builds.

VIDEOCARD

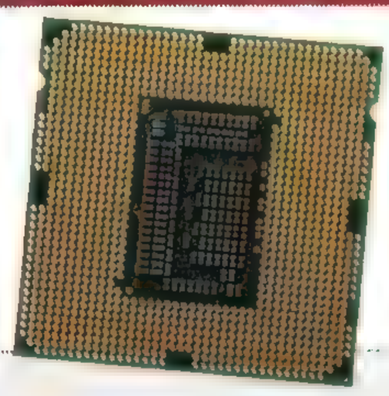
GIGABYTE HD7870 OVERCLOCKED

PRICE $260

Performance close to the 7950, with a pricetag nowhere near. it also looks like there won't be new GPUs for a while yet, so this card will last a while.

THE PERFECT PC

CPU

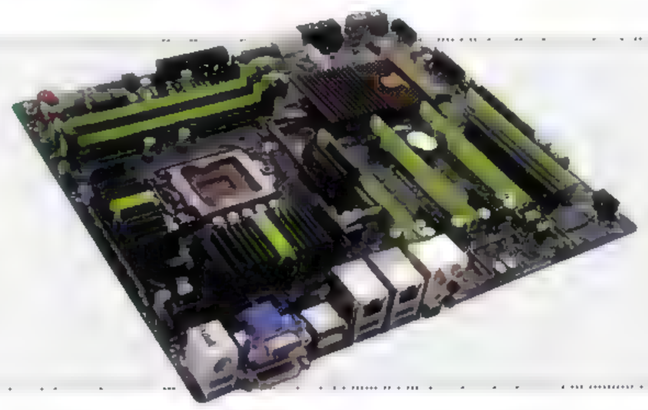


INTEL CORE I7 3770K

PRICE $350

8 Threads of Ivy Bridge efficiency, Overclock for justice! This CPU is so good it has rendered the Socket 2011 enthusiast platform redundant.

MOTHERBOARD



GIGABYTE G1 SNIPER 3

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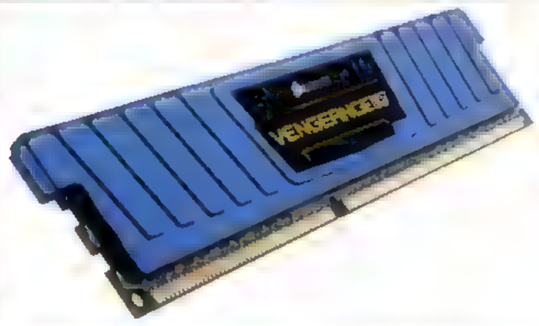

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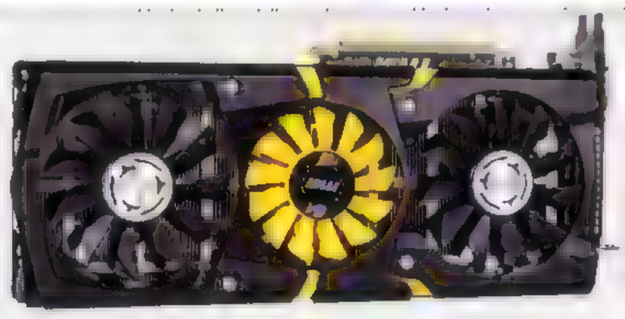
VIDEOCARD



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TT ESPORTS CRONOS
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ONBOARD REALTEK ALC889A
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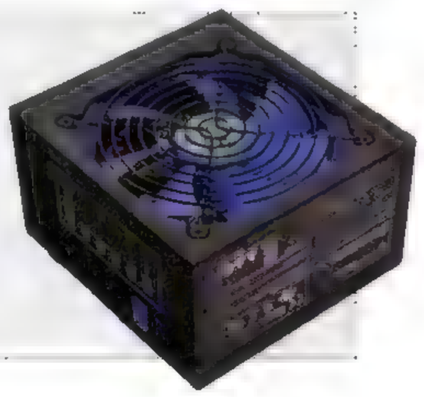

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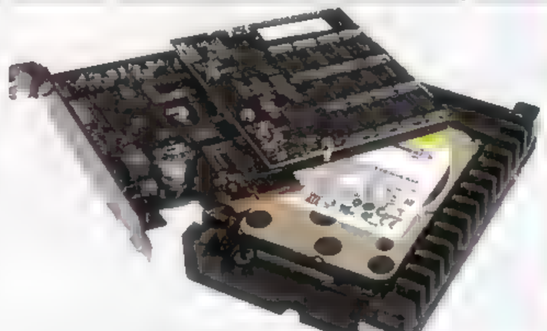
SYSTEMDRIVES



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HOW TO

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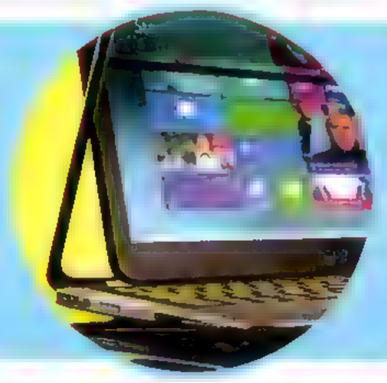
SYSTEMBUILDER

Bring an old PC up to speed

86

HOW TO

Windows 8.1: advanced features



90

BROUGHT TO YOU BY THERMALTAKE

SYSTEM BUILDER: Bring an old PC up to speed

DARIEN GRAHAM-SMITH EXPLAINS HOW TO UPGRADE OUTDATED HARDWARE AND GIVE YOUR AGEING PC A NEW LEASE OF LIFE

Many of us are using PCs that are several years old – and if the hardware is still doing its job, this is fine.

However, the march of technology quickly leaves such systems behind. As such, if you ever want to upgrade your ageing hardware, it can seem like your only option is to junk it and buy a whole new system.

It doesn't have to be this way. On these pages, we'll guide you through your options for revitalising your supposedly outdated hardware. Whether it's a comparatively recent Windows 7 system or a decade-old clunker, you might be surprised at how upgradeable it is.

A THREE YEAR-OLD PC

A PC purchased in 2010 isn't exactly old, but some of the core technologies will already have been superseded – in particular, the CPU. If it's a laptop system, the processor probably won't be replaceable at all. A desktop system will likely use either an Intel Core 2 processor or a "Westmere" Core i3 or Core i5 model. Both of these platforms were superseded in 2011 by the more powerful Sandy Bridge architecture, which introduced a new socket and chipset; unless you're willing to replace the entire motherboard (see *Replacing the motherboard*, opposite) there's very little scope for a significant upgrade. The situation is similar with AMD processors: after the Phenom II range, the chip-maker switched to new chip sockets, dubbed FM1 and AM3+, which won't be found on motherboards of this vintage.

However, there are other things you can do to give such a system a boost. In 2010, a low-cost PC may have come with 2GB of RAM. If that's the case with your system, it could be dragging down performance by requiring the OS to frequently use the hard disk as extra virtual memory, especially if you regularly switch back and forth between modern applications.

The obvious solution is to add more RAM. Going up to 4GB should smooth out performance; if you want to go higher, check that you're running a 64-bit OS, since 32-bit systems can't address more than this. Also, check the technical documentation for your motherboard or laptop to determine the maximum supported amount of RAM. It's a good idea to check how many RAM sockets you have free, too – do you need to replace existing DIMMs, or can you simply add to them? Lastly, remember that in 2010 both DDR2 and DDR3 were in use; you'll need to check which type of module to buy.

Another thing you can do if your system is constantly thrashing the hard disk is switch to a solid-state drive (SSD). This will make any PC

noticeably snappier and smoother – and a PC from 2010 will certainly support the SATA standard used by today's SSDs, so you don't need to worry about compatibility.

There are two caveats, however. First, your system will probably have only a 300MB/sec SATA II connector, so there's no point paying extra for a 600MB/sec SATA III drive – you won't see the full benefit of its maximum speed. Second, to benefit fully from an SSD, it should be your system drive. Ideally, that means carrying out a fresh installation of Windows and all your applications. If you use imaging software to copy Windows from a mechanical disk to an SSD, you should get Windows to re-rate the disk afterwards, so it knows to enable TRIM and treat it as an SSD. To do this, open a command prompt and type "winsat disk".

Upgrading the RAM and moving from a conventional hard disk to an SSD should make your PC feel much faster, despite its older CPU. If gaming performance is a concern, you can also freely upgrade the graphics, at least on a desktop system: the PCI Express slots on a 2010 motherboard are fully compatible with today's most powerful graphics cards. These slots are also your gateway to conveniences such as USB 3 and Gigabit Ethernet, if your system doesn't already have it.

▲ AMD switched to new chip sockets after its Phenom II range

If you're on a laptop, you may well be able to add high-speed connectivity via an ExpressCard slot. You can buy a two-port ExpressCard/34 USB 3 adapter for around $50. This will allow you to hook up a fast external hard disk. It isn't an elegant solution – the ports stick some way out of the side of your laptop – but it's cheaper than buying a new laptop with USB 3 built in.

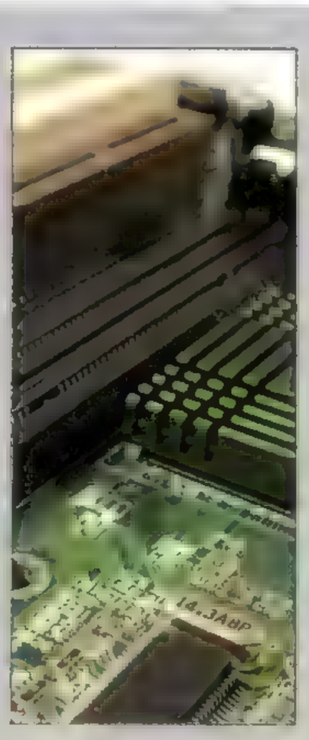
A FIVE-YEAR-OLD PC

If your computer is of the 2008 vintage, it probably came with 2GB or even 1GB of RAM. If you haven't upgraded this, doing so should be your first priority – especially if you're sticking with the notoriously weighty Windows Vista. Your OS will most likely be a 32-bit edition, which means you can install up to 4GB of memory without upheaval. You'll need to use old-style DDR2 DIMMs, but it's easy to track down 240-pin desktop modules and 200-pin SODIMMs for laptops. Don't worry about speed ratings – published DIMM speeds

REPLACING THE MOTHERBOARD

If your desktop system's outdated expansion options are holding you back, one option is to go the whole hog and replace the motherboard. The majority of systems sold in the past ten years use the ATX or microATX form factors, which remain standard, so switching to a new board should be rather straightforward (leaving aside the fiddly matter of contending with all the necessary screws and connectors). Once your newboard is installed, you'll gain support for the latest CPU socket, a modern SATA III controller and built-in support for conveniences such as USB 3 and Gigabit Ethernet – and you can keep your old case and components.

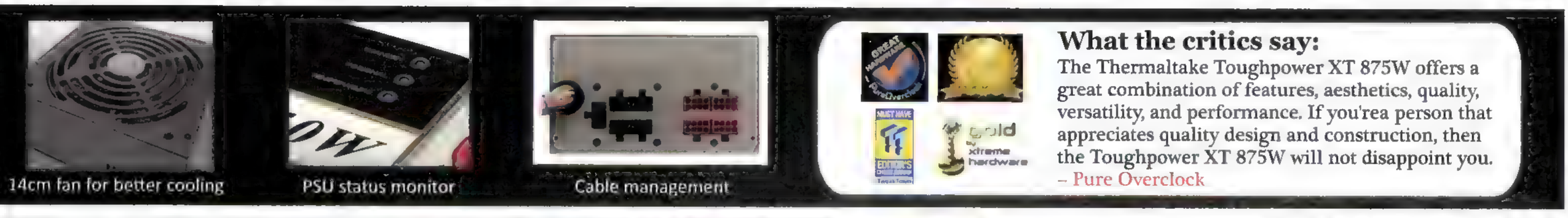
Before taking the plunge, however, there are a few things to bear in mind. It goes without saying that you'll need a new CPU to go in your new motherboard, but remember that a new board will also need DDR3 RAM, and it certainly won't include an IDE controller. If your existing DIMMs and drives are from a previous generation, you may need to replace them, or buy a legacy IDE controller. Even if your hard disk will simply plug into a new board, there's no guarantee that Windows will continue to work. Once the operating system is set up, it doesn't expect low-level hardware resources to change; we've seen plenty of Windows installations refuse to boot when they've been



▲ Changing your motherboard should be relatively simple

moved from one motherboard to another, especially between Intel and AMD architectures. You might get lucky – if Windows makes it to the desktop, it will set about re-detecting your updated hardware – but brace yourself for the possibility that you'll need to reinstall. Either way, you'll need to reactivate Windows once you're fully up and running.

Finally, it's worth noting that if you have an OEM edition of Windows, your licence is tied to the computer on which the OS was first installed. Moving the OS to a new motherboard and processor is counted as moving to a new PC, and thus violates these terms.



▲ It's much cheaper to buy an ExpressCard/34 USB 3 adapter than fork out for a new system

represent maximum transfer rates, and modern modules will happily run at slower speeds to work with older chipsets.

Again, an SSD is an excellent upgrade for a PC of this era. Your drive controller certainly won't support full SATA III speeds, but you can still use any SATA II or SATA III drive, and doing so will give your system a major shot in the arm. If you're using Vista, though, be warned that this operating system isn't optimised for SSDs, and doesn't support the TRIM command that helps SSDs retain their full operating speed.

For tips on keeping your SSD running at maximum efficiency, check out this feature from our colleagues at bit-tech.net: **http://tinyurl.com/mtsuocj**.

If you're looking to enhance the number-crunching capabilities of a desktop system, a CPU upgrade isn't necessarily out of the question. If your current processor is an Intel Core 2 Duo, you may well be able to upgrade to a faster model or a quad-core edition; if it's an AMD system, it will probably be using a Phenom or Athlon processor plugged into AMD's Socket AM2+, in which case you can normally upgrade it to a more recent AMD Phenom II processor.

You'll need to check your motherboard for compatibility – a BIOS update might be required – and obviously performance won't match the best of today's processors. But Intel's Core 2 Duo E8600 and AMD's high-end Phenom II models still offer performance roughly comparable to a modern Core i3 processor, and secondhand chips regularly sell on eBay for less than $100.

Desktop systems from this era will ordinarily offer at least one PCI Express slot, so they can be upgraded with modern graphics, networking capabilities or USB 3 connectivity, too. An ExpressCard socket is common on laptops from this time, providing a simple – if inelegant – upgrade path.

A TEN-YEAR-OLD PC

When it comes to systems dating back to 2003, we're dealing with hardware that's truly of a different era. The most popular processors in PCs of this period were Intel's "Northwood" Pentium 4 and AMD's Athlon XP. By today's standards, these are extremely slow chips, and while it's possible to fit later models into their motherboards, you'll never achieve performance anywhere near modern standards. The fastest chip that will go in Intel's contemporaneous Socket 478 is the 3.4GHz Pentium 4, which – with its single-core design and 512KB cache – is, in terms of raw processing power, roughly on a par with a 2013 Atom CPU.

"If you're running Windows on 1GB or less, an upgrade will make a big difference"

SPRING-CLEAN YOUR STARTUP ITEMS

If you've been running Windows for a few years, you've probably ended up with a host of programs that load automatically each time your computer starts up.

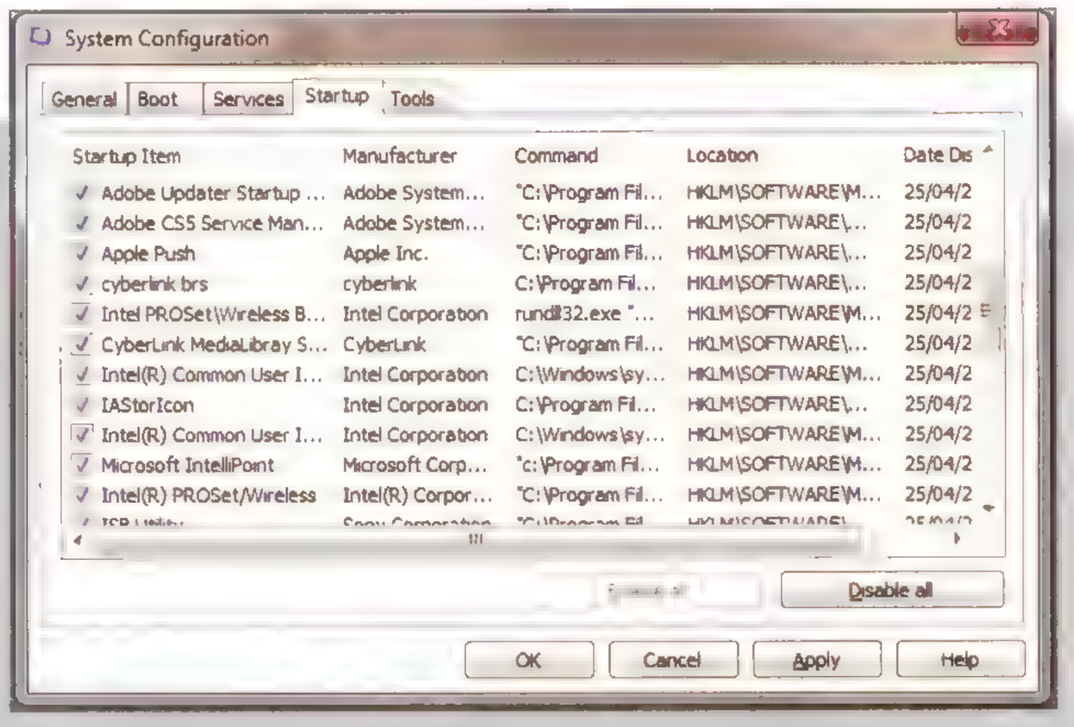
Individually, these programs may be small and simple, but together they can have a huge impact on Windows' performance: trying to load and initialise them at once can make Windows slow to a crawl.

Even after they've loaded, these processes will continue to consume your PC's memory, slow things down and, in many cases, get in the way with pop-up notifications and requesters. This is why people sometimes perceive that Windows itself slows down over time.

The solution is simple: disable the programs that you don't want running. Sadly, Windows doesn't expose a user-friendly way of doing this, but in all versions of Windows since XP, you can bring up a Run requester by pressing Windows+R, then enter "msconfig" to run a hidden system tool that makes it easy. Click on the tool's Startup tab to see a complete list of programs that run at startup – there'll probably be far more than you realised.

To prevent unwanted items from running automatically, simply untick them. Don't worry about disabling something important: in our experience, startup items are almost always "helper" tools, rather than crucial software components. It certainly won't do you any harm to start by turning everything off, then selectively re-enabling items if you find you miss them.

Once you're done, click Apply and restart your PC to see the effect. It may well be dramatic – with no unnecessary startup items wasting resources, you should be most of the way back to that "fresh PC" feeling. In fact, you may even find you no longer need to invest in a hardware upgrade to get satisfactory performance out of your last-generation hardware.



▲ Your startup items can have a dramatic effect on performance

There are steps you can take to speed things up, however. In 2003, memory cost around $200 per gigabyte, so a brand-new system might have come with as little as 128MB of RAM. If you're running Windows on 1GB or less, an upgrade will make a big difference to responsiveness. Compatible modules are still available from specialist suppliers and secondhand vendors – and at competitive prices (expect to pay around $50 per gigabyte); just check whether your system uses DDR memory or older SDRAM modules. It's also a good idea to ensure that the memory you have isn't being wasted by unnecessary processes (see *Spring-clean your startup items*, p88).

Switching to an SSD is another way to revitalise performance, but a PC of this age may well lack a SATA controller and rely instead on the older IDE standard. A few manufacturers such as Transcend make IDE SSDs, but today's fastest and most capacious models all require SATA.

On a desktop system, you can get around this by buying a slot-in SATA controller. However, since your system will probably also lack a PCI Express slot, you'll need a controller card in the older, conventional PCI format. Owing to the bandwidth limits of that bus, such controllers normally support a maximum 150MB/sec transfer rate, so you won't see the full performance benefit of an SSD attached in this way. Remember, too, that older operating systems won't be optimised to get the best performance or lifespan from an SSD.

For all these reasons, you might opt to replace an old hard disk with a newer IDE model, such as Western Digital's 7200rpm 250GB Caviar Blue model. Higher spindle speeds and data densities and bigger onboard caches – the Caviar Blue offers 8MB, rather than the 2MB of older models – all translate to better performance. The benefit may not be as dramatic as switching to an SSD, but it's a cheap and simple drop-in replacement.

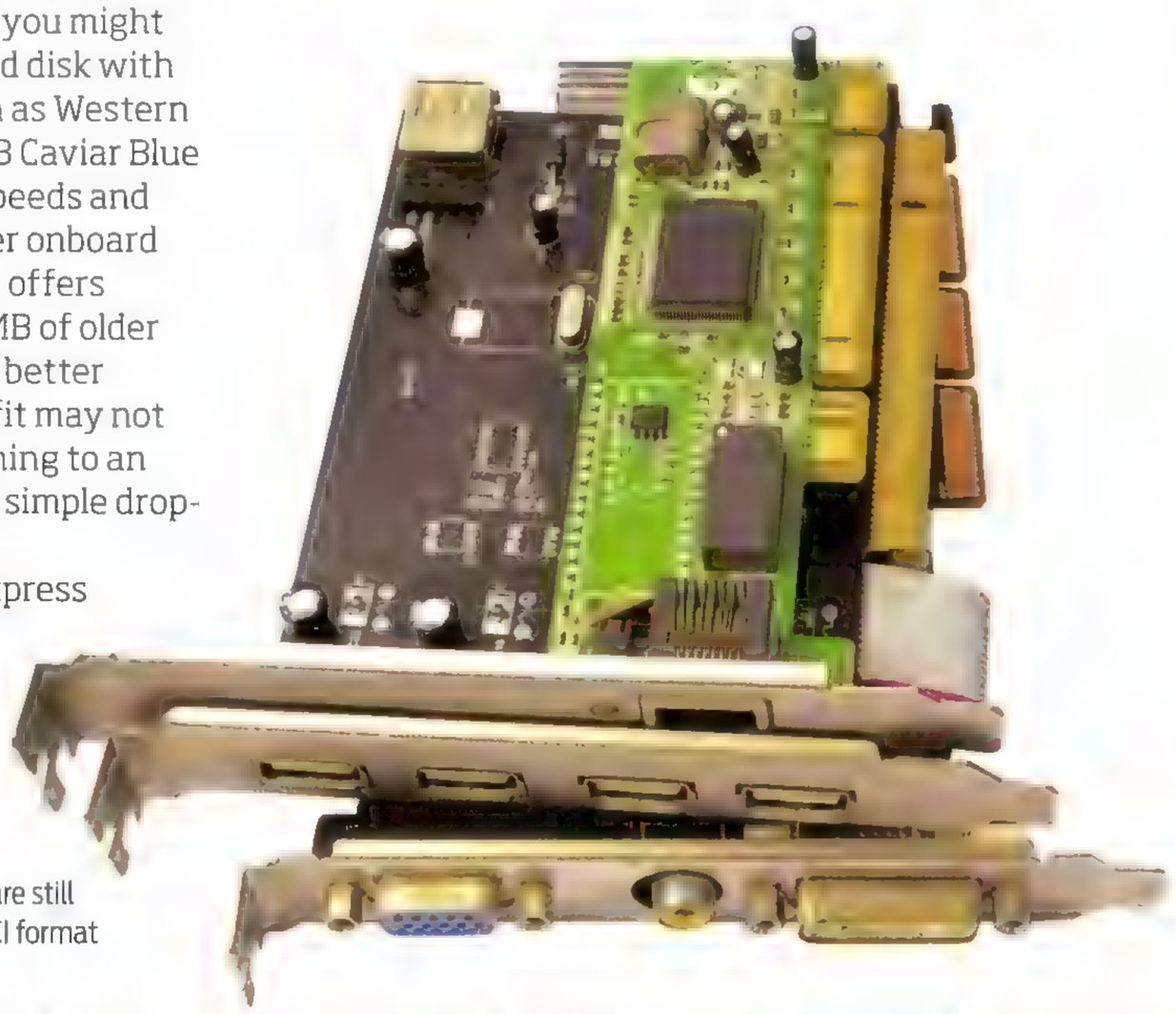
The absence of PCI Express also rules out the latest graphics cards. However, until a few years ago, some low-end cards were still made to fit the older AGP slot. A trip to eBay or your local secondhand shop may well yield something that will work with your motherboard. Don't expect killer 3D gaming performance, though: the most powerful AGP graphics cards out there will only be able to keep up a playable frame rate with low-detail settings, and that's assuming the rest of your system is up to the task.

In terms of connectivity, Gigabit Ethernet and 802.11n wireless cards can be added to an older desktop system via conventional PCI, and it's even possible to add a USB 3 controller – Umart, for example, offers a four-port PCI card that will cost you around $25 online. If you're using a laptop, fast wired and wireless networking can be installed via the PC Card slot, although as with the newer ExpressCard format, you'll have to live with connectors awkwardly sticking out of the side of your laptop. Also, you can't get USB 3 in this format, since the PC Card interface isn't fast enough to support it.

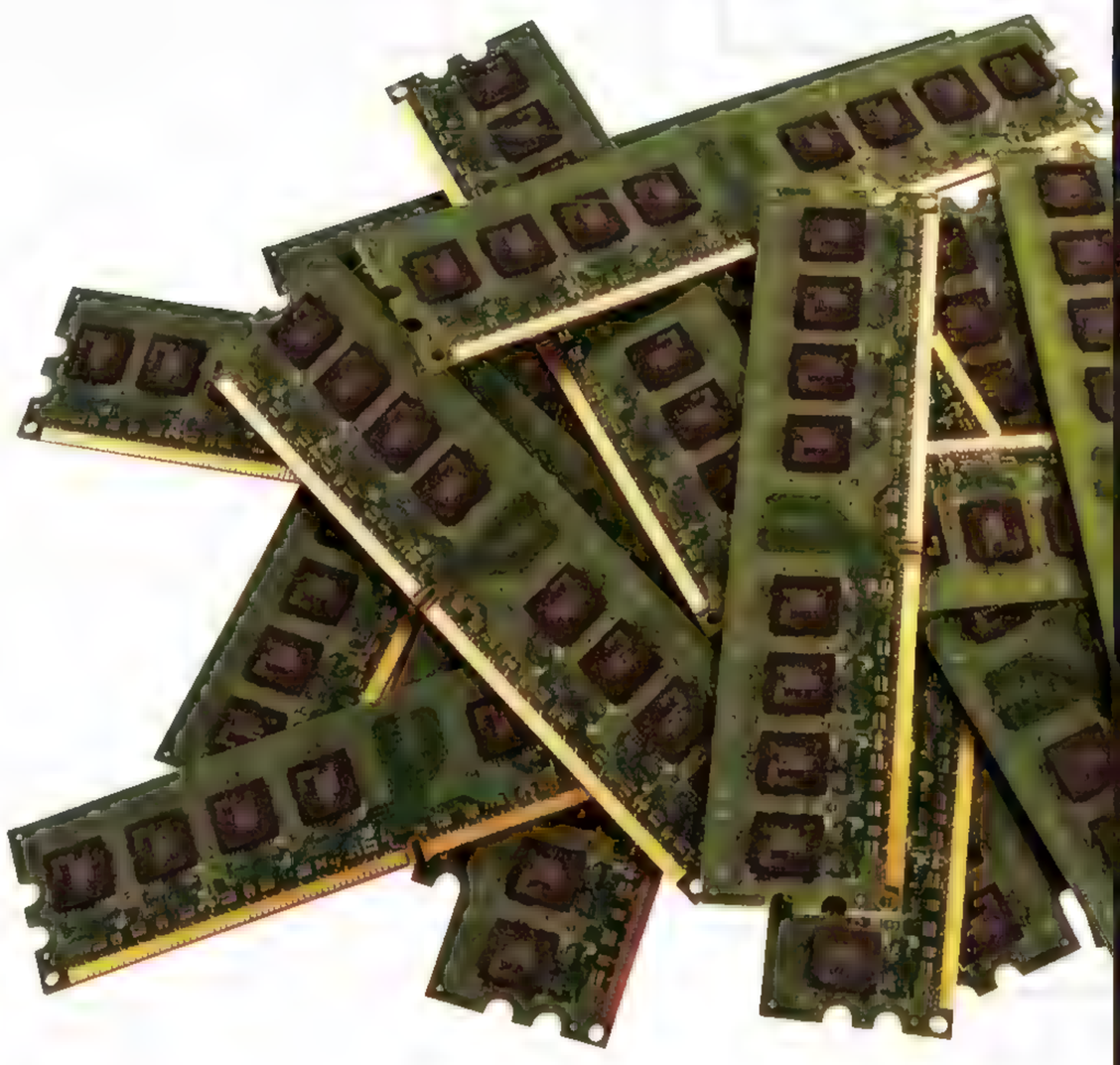
FIFTEEN YEARS OR MORE

If you're still using a PC from the 1990s, there's zero chance of souping it up to match the performance of a modern workstation. However, a computer from this period may well offer one or more PCI slots, and while 16-bit Windows is dead and buried, the hardware should be capable of running Windows XP; in theory, it can support almost as wide a range of hardware and software as the more recent systems above.

Let's be clear, however: it won't



▶ Expansion cards are still available in the PCI format



be a breezy experience. Officially, Windows XP will run on any PC with a 233MHz processor and 64MB of RAM, but in practice it will crawl along on a system like that. We recommend installing as much memory as you possibly can. Motherboards from this era can often support 256MB of RAM, in the form of four matching 64MB DIMMs. However, you might have to keep an eye on eBay to find such modules, as they were never sold in large quantities – in 1998, a PC would more commonly have come with a pair of 16MB modules.

If you're still using the original hard disk, you'll definitely need to upgrade that as well: a contemporary 2GB disk won't be big enough for XP and your applications. There's a fair chance the onboard controller will be limited to a maximum drive size of 8.4GB, and a maximum IDE transfer rate of 33MB/sec, so investing in a PCI-based controller is strongly recommended.

A final important point to note is that Windows XP is already into Extended Support, and Microsoft plans to stop rolling out security updates entirely next year. With this in mind, we can't recommend it for general use.

More recent editions of Windows won't install on such old hardware, so if you want to keep your antediluvian PC in service beyond 2014, we suggest you investigate the possibility of using a lightweight Linux distribution such as Lubuntu (**www.lubuntu.net**). This remains fully supported, and is officially usable on a Pentium II or Celeron system with more than 128MB of RAM. ■

HOW TO:
Windows 8.1: advanced features

IT'S NOT ONLY ABOUT THE START BUTTON. **DARIEN GRAHAM-SMITH** HIGHLIGHTS TEN TECHNICAL ENHANCEMENTS TO LOOK OUT FOR IN THE LATEST VERSION OF WINDOWS

Windows 8.1 arrives on Friday 18 October. It's a free update for every Windows 8 user, including those on ARM-based RT devices, so most of us will install it as a matter of course.

If you haven't played with Microsoft's Preview release, there are plenty of new experiences in store, both large and small. Some are big changes that you'll notice right away: the enlarged Start screen tiles, for example, jump out at you as soon as you power up your PC. But there are also plenty of advanced, under-the-bonnet upgrades that make Windows 8.1 much more than a service pack. Here's our breakdown of ten of the most powerful features in 8.1 that will benefit power users, businesses and developers.

1 Mobile tethering

Windows 8 is designed for out-and-about use; increasingly, this means laptops and tablets with mobile data connections. Windows 8.1 introduces the ability to share a 3G or 4G connection with other devices over Wi-Fi, turning a Windows tablet into an ad hoc hotspot. If you're logged into a client device with the same Microsoft account as the gateway device, no configuration is required, and connected clients will automatically detect that they're using a tethered connection and

default to "cost-aware" mode.

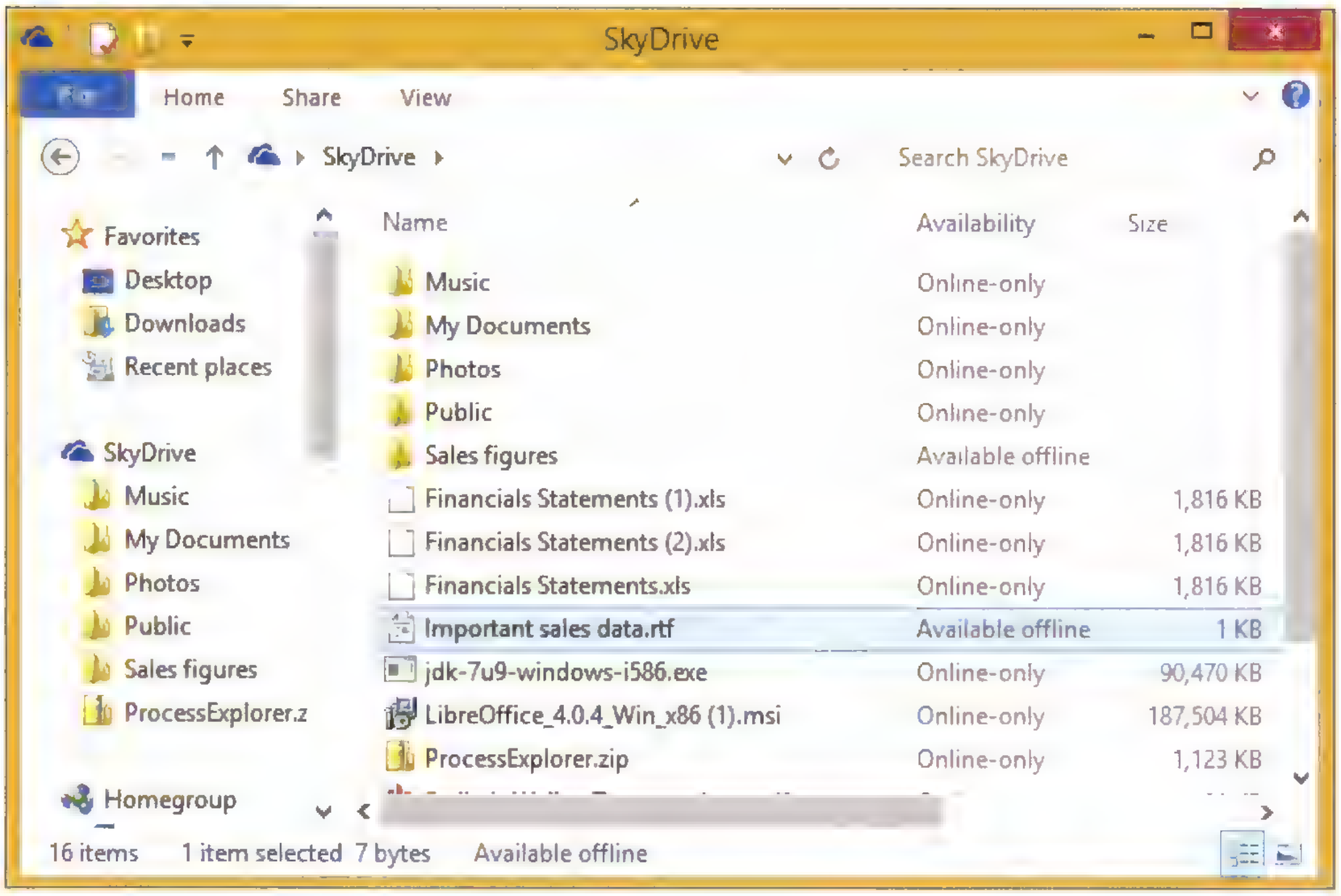
There's also a new settings interface specifically for mobile connections, which lets you manage your mobile network, set and change your SIM PIN, and keep track of estimated data usage.

2 PER-DISPLAY INTERFACE SCALING

It's long been possible to scale up Windows' fonts and icons to a maximum of 500%. But what's right for your main screen isn't necessarily going to work for a secondary display. Take, for example, Samsung's Ativ Book 9 Plus, which is sold overseas and boasts a 3200 x 1800 display. The user interface is scaled to 200%, which keeps everything at a comfortable size on the built-in panel. However, if you connect this laptop to a 1080p TV, that scaling factor produces absurdly oversized text and icons.

Conversely, high-end TVs are already starting to hit 4K resolutions (3840 × 2160); hook up a regular laptop set to 100% scaling and everything will appear tiny.

Windows 8.1 solves this by letting you scale each screen independently. To access this new setting, right-click on the Windows desktop, select Screen Resolution from the dropdown menu and select "Make text and other items larger or smaller".



▲ Your SkyDrive files are pulled from the cloud as you use them, saving local storage space

3 THIN CLOUD STORAGE VIA SKYDRIVE

Windows 8.1 integrates cloud storage into the OS; a SkyDrive dropdown now appears in the navigation pane of every Explorer window. However, this isn't the basic syncing service we've seen before. Although your files appear to be right there on your desktop (or in the SkyDrive tablet app), the SkyDrive view is now actually a window into your cloud storage space. The files you see don't take up any space on your local disk until you double-click to open them, at which point they're quickly downloaded and opened. When you've finished with

SKYDRIVE AND LIBRARIES

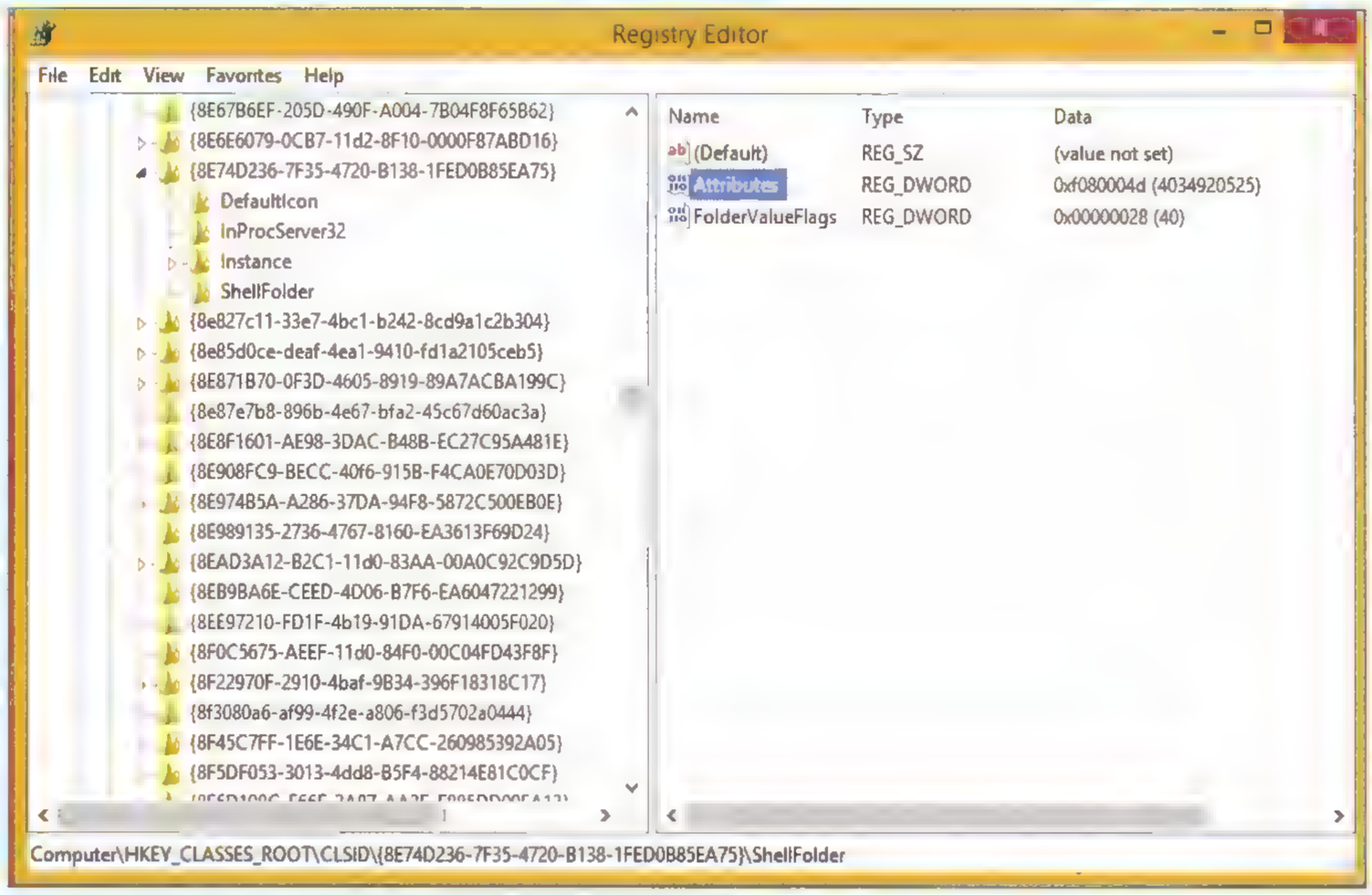
When it comes to lightweight laptops and compact tablets, space is often at a premium. For this reason, Microsoft has chosen to downplay local storage in favour of SkyDrive, and your libraries are no longer shown by default in the navigation pane in Explorer windows.

However, the libraries are still there, and can be easily restored to their former place: all you need to do is right-click in the pane and tick Show Libraries to restore the familiar dropdowns.

If you want to get rid of the SkyDrive dropdown, things are trickier. One way is to turn off the feature entirely by going to the PC Settings app, selecting the SkyDrive pane and disabling the "Save documents to SkyDrive by default" setting.

Annoyingly, there's no officially supported way of hiding the dropdown from Explorer while keeping the service working, but it's possible via a Registry hack. It goes without saying that you shouldn't try this unless you're comfortable making technical tweaks, and you should back up your Registry first, in case you make any mistakes.

If you're willing to take the plunge, open regedit.exe (from the search interface or a command window) and navigate to HKEY_CLASSES_ROOT\CLSID\{8E74D236-7F35-4720-B138-1FED0B85EA75}\ShellFolder. In



▲ Get rid of the SkyDrive dropdown by editing a DWORD value called Attributes

order to edit the contents of this Registry location, you'll need to take ownership of it – right-click on the ShellFolder icon, then select Permissions | Advanced | Change, enter your own username and click OK three times to close all the open requesters. Once you've done this, you'll be able to edit a DWORD value called Attributes. By default, its value should be set to f08004d; to hide SkyDrive, simply modify this to f09004d and restart your PC. The dropdown will no longer show up from your Explorer windows, but you still will be able to access SkyDrive via your user profile folder in C:\Users.

WHERE'S WINDOWS 7 FILE RECOVERY?

Almost everything that's new in Windows 8.1 extends the capabilities of Windows 8. One thing that's quietly gone missing, however, is the Windows 7 File Recovery tool. As the name implies, Microsoft considers this tool deprecated in favour of the more versatile File History tool, so upgrading may involve a change to your backup routine. Don't panic, though, since you can still manually access your old backups if need be – your stored files are archived as a series of ZIP files on your Windows 7 backup drive.

them, they're quietly synced back to the cloud. You can also download files for full-time offline access by right-clicking and selecting "Make available offline", and reclaim the space taken up by local files by selecting "Make available online-only". For more on this, see SkyDrive and libraries, above.

4 MIRACAST WIRELESS DISPLAY SUPPORT

We wrote last month about the possibility of wirelessly connecting a TV to your PC. Windows 8.1 includes native support for this feature, as long as your system has a graphics chipset that's compatible with the Miracast standard (that includes Intel's WiDi, which is a compulsory part of every Haswell Ultrabook).

To connect to a Miracast device, open the charms, then select Devices | Project | Find Display, and select your TV from the list that appears.

5 POWERSHELL 4

For systems administrators, Windows 8.1 introduces a major new release of PowerShell (which is also being made available for Windows 7, and Windows Server 2008 R2 and 2012). The key new feature is a system called "Desired State Configuration", which lets you implement settings and installations across a network by simply pushing a script-style configuration file to the desired clients. For example, you might create a file declaring that certain server roles must be activated, certain Registry settings must be enforced, and specific applications must be installed. When the client PC receives these instructions, the PowerShell host checks the system state and quietly applies changes as needed. It's a terrific time-saver that can effectively turn major rollout projects into brief scripts.

6 WORKPLACE JOIN AND WORK FOLDERS

Windows 8's dual personality encourages the use of a single device at home and in the office. Windows 8.1 – in conjunction with Windows Server 2012 R2 – supports this with a feature called Workplace Join. This lets IT managers authorise personal devices to connect to selected network resources, such as shared folders and printers, without giving them free rein on the corporate LAN. It's partnered by the new Work Folders feature, which lets Windows 8.1 users automatically sync data back and forth across their user space on the workplace's LAN – even on devices that aren't connected to the domain – while leaving personal files untouched. The administrator can also insist on security policies such as encryption and lockscreen passwords. IT managers can even remotely wipe the contents of work folders and company emails from users' personal devices without disrupting their personal data.

7 WI-FI DIRECT AND NFC PRINTING

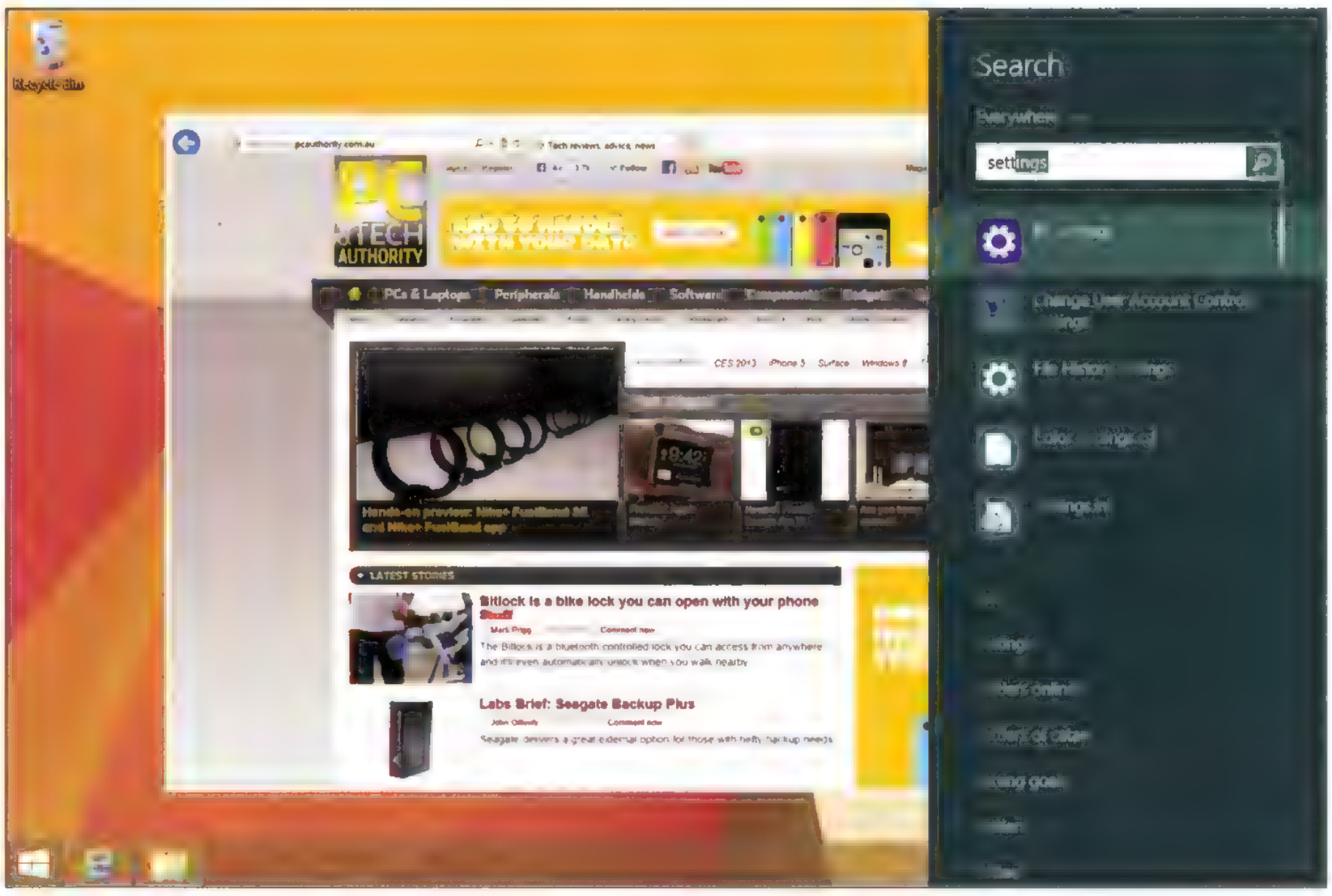
Windows 8.1 supports Wi-Fi Direct pairing, letting Windows devices connect directly to supported printers without requiring them to join the local wireless network or download and install clunky drivers. To search for a compatible printer, open the tablet-style PC Settings app, select "PC and devices", then click Devices | Add A Device. Businesses can also take advantage of NFC pairing, which lets you connect to a printer by tapping a Windows 8.1 Enterprise device against it. It seems this may work even with non-NFC-equipped printers: Microsoft says it will be possible to retrofit older models with NFC tags, although it hasn't yet revealed how.

8 INSTANTGO

InstantGo is Microsoft's new "connected standby" feature, which keeps data, apps and tiles on

BETTER SEARCH

Whereas Windows 8 split your search results across three categories, Windows 8.1 shows them in one place. What's more, if you search using the Search charm (or via the new Windows+S shortcut), your results appear in a neat bar at the side of the screen, rather than taking over your whole display. By default, Windows now searches your SkyDrive files in the cloud as well as local files, and it can also search data within apps, such as email messages in Mail and individuals in People.



certified hardware in sync while the device is asleep – and promises wake-up times of less than 300ms. InstantGo-compatible laptops and tablets can also take advantage of Windows 8.1's full device-encryption feature, which is now available for all versions of Windows. This harnesses the security of the TPM to make it effectively impossible for a thief (or the lucky finder of a lost laptop) to access sensitive data without the user's credentials.

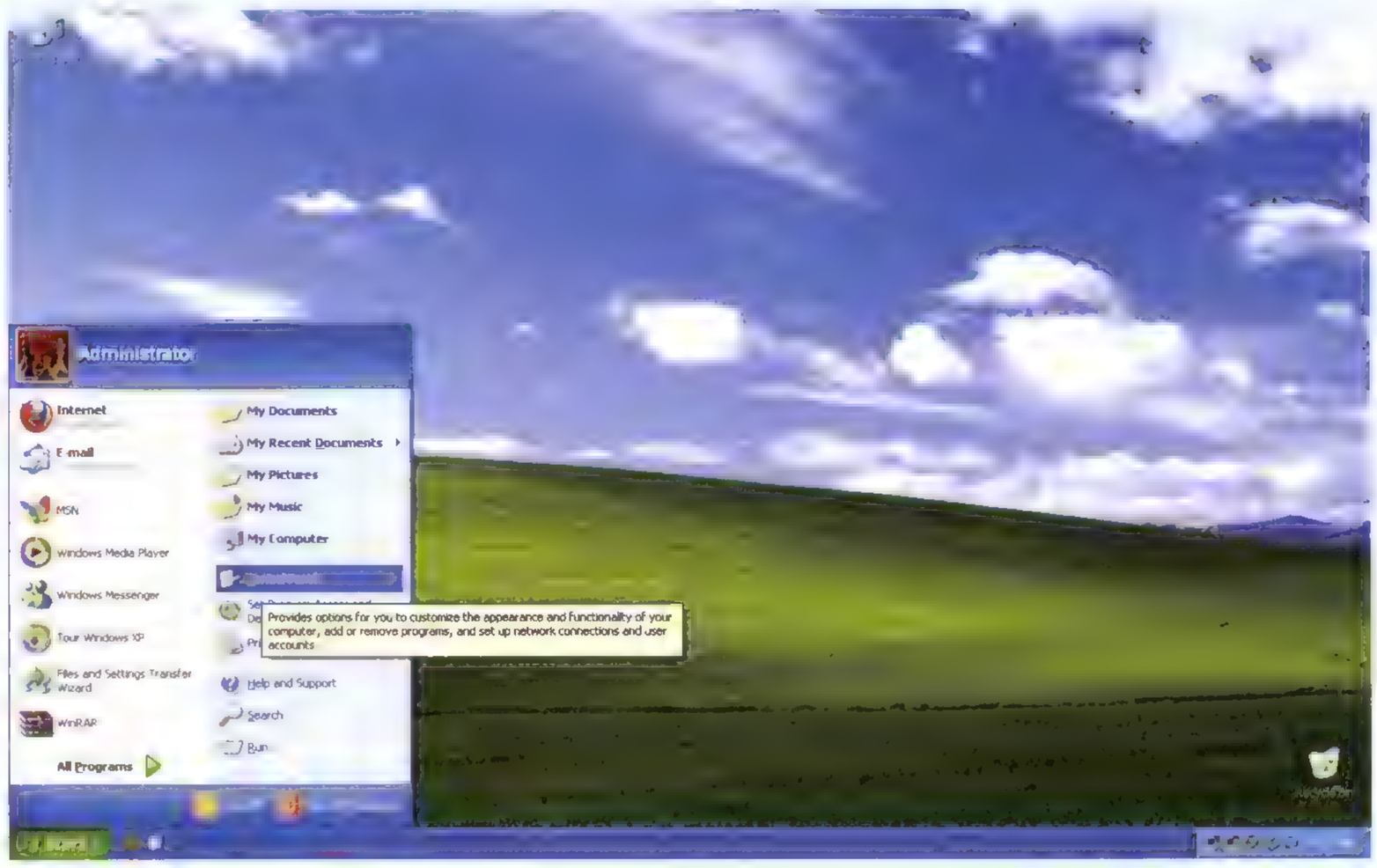
9 NEW APIS

Windows 8.1 introduces dozens of new features for developers of Modern apps. Programs that target the newest OS gain new file-handling capabilities, multimedia functions, in-app purchases and more than 20 new interface elements, including navigation bars and flyout menus. It's also now possible for apps to interface directly with USB and Bluetooth devices and talk to 3D printers. You can see full details of the developer enhancements in Windows 8.1 at **tinyurl.com/qah3rzj**. To take advantage of them, you'll need the Windows 8.1 SDK, plus the free Visual Studio Express 2013 package to help you assemble and deploy your apps. These can be downloaded from **tinyurl.com/kmnfqh9**.

10 GESTURE CONTROL

Never mind Kinect, or the iffy Leap Motion Controller (reviewed on page 52): Windows 8.1 introduces basic gesture controls using a regular webcam. Admittedly, they're not exactly sophisticated, and at present they work only in one very specific place – the new Food & Drink app. Anticipating that users might not want to dab at their screens with wet or floury hands, the developers have built a hands-free mode that lets you turn the pages of a virtual recipe book by waving a hand left or right in front of your laptop or tablet's camera. At this stage, it's more a feature demo than a key OS function, but it works surprisingly well. Hopefully, it will open the door to more sophisticated applications of the idea. There are also some more advanced third party solutions that take a similar tack and leverage webcams – the most impressive that we have seen is one from AMD that is supported by its latest APUs and unimaginatively dubbed AMD Gesture Control.

THE INEVITABLE UPGRADE



We are constantly astonished when we hear from readers who are still running Windows XP as their OS of choice. While we totally understand the sentimental attraction to the classic OS, and the horrible generational leap that was Windows Vista, the reality is that both hardware and software has well and truly moved on from the glory days of Windows XP.

The situation is only going to become worse next year when Microsoft finally ceases all support for the twelve year old operating system. This means that it will be even more vulnerable to exploits and malware, and for the average consumer running Windows XP will be even riskier than it currently is.

Since the OS was launched Microsoft, and the industry as a whole, has evolved significantly, and not only does the OS lack modern security features like the at times annoying but very important User Access Control, but it doesn't support a lot of the hardware technologies that have transformed the PC in the past decade. That means no proper support for TRIM commands, rendering SSDs a less than enticing prospect (TRIM enables the SSD to clear 'deleted' blocks of flash memory during idle times, ensuring that performance remains snappy), no support for the latest DirectX technologies, and dwindling driver support.

For a lot of people reading this, the very concept of those with an inherent interest in PCs running Windows XP may sound counterintuitive, but we still hear about it with shocking regularity. We can understand that there are still some commercial areas where there is no need for a more advanced operating system, such as in older digital signage and point of sale solutions, where the OS sits behind a farily lightweight, heavily customised interface. Microsoft does have a program in place for big companies who want to continue having their Windows XP solutions supported, but this costs big dollars and doesn't mean that the results will ever make it to the public. That means for consumers security holes will stay unplugged, and drivers will fall more and more behind.

This impending end of life of Windows XP means that Windows 8.1 is going to be the upgrade option for the majority of those who are stubbornly clinging on to 2001. If you really cannot stand the thought of the modern UI lurking in the background, you can still find copies of Windows 7 for sale, but the learning curve with Windows 8.1 isn't anywhere near as tricky as it seems, and is even smoother with the changes introduced in the latest version. We have been running Windows 8 as our main OS for a year now, over various systems, and seldom find ourselves having to navigate through the modern UI features. This can be made even simpler with some of the Start Menu replacement programs, which eliminate the main annoyance with the OS (the tweaks in Windows 8.1 are appreciated, but they still feel like a slightly passive agressive response to the demand for the start button's return).

Our personal choice is the free Classic Start program, if only because it is the one supplied by one of our favourite online tools, **www.ninite.com**, which allows for quick installing of programs on fresh PCs. The other popular option is Stardock's Start 8, which costs US$4.99 and can be found at **www.stardock.com/products/start8/**.

The reality is that with the launch of Windows 8.1 a lot of our annoyances with Microsoft's shifted philosophy are a thing of the past. Ironically our finding of peace with the OS has largely derived from the realisation that we can just ignore the live tiles, app store and other fluff added in Windows 8 and with a few minor adjustments live as happily on the desktop as we did with Windows 7, or indeed any other earlier version of Windows.

Microsoft is going to continue down its current path, and following is nowhere near as annoying as continuing to use Windows XP.

I'm versatile

NEW!

ScanSnap SV600

- Minimise unevenness in image quality with the new "VI Technology"
- A3 sized documents or thick documents can be scanned directly without touching the surface of the precious document
- Less than 3 seconds are needed for scanning
- Shorten operation with "Page Turning Detection"
- Correct distortion and curviness of books with "Book Image Correction"

A new perspective on scanning

Simply push the scan button on the ScanSnap SV600 to start scanning. You can scan documents which are impossible to scan using an ADF scanner. Large documents, thick books, and your precious memories. You don't need to cut out pages anymore and you can even scan multiple document in one go. These are all made possible by the new Versatile Imaging Technology. Scan it with Fujitsu.

If you would like more information please contact Proscan 1300 132 001

au.fujitsu.com/scanners

shaping tomorrow with you

FUJITSU

Facebook's antisocial security problem

DAVEY WINDER SYMPATHISES WITH A WHITE HAT WHO GOT ON THE WRONG SIDE OF MARK ZUCKERBERG, AND WARNS ABOUT FAKE "LIKES" ON SOCIAL NETWORKS

Khalil Shreateh, a Palestinian programmer and security researcher, thought he was doing the decent thing by reporting a security vulnerability he'd discovered that allowed anyone to post to anyone else's Facebook page, regardless of friendship status. Indeed, Facebook actually encourages such ethical disclosure by operating a white-hat bounty scheme at **www.facebook.com/whitehat** for those who find and report such vulnerabilities.

However, rather than offering him a financial reward in line with the scheme, the Facebook security team told Shreateh the flaw wasn't a bug at all and left it at that. But Shreateh wasn't prepared to let such a serious loophole – which permitted privacy settings to be overridden – go unacknowledged. The ultimate power at Facebook rests with founder and CEO Mark Zuckerberg, so Shreateh used his not-a-bug to post a message straight to the top – onto "Zuck's" own wall.

The programmer apologised for "breaking [Zuckerberg's] privacy", explaining that he "had no other choice". That did the trick; a few days later, Facebook fixed the bug it had insisted didn't exist. However, the company didn't so much thank Shreateh as accuse him of violating Facebook's responsible disclosure policy by using the account of a real person without their permission. As such, Facebook told Shreateh he wouldn't be getting paid in accordance with the bug bounty scheme.

> Shreateh was doing Facebook a favour and its security team told him to go away

Matt Jones, a member of Facebook's security team, went on record to say the company has paid out more than $1 million in bounties to hundreds of people. He also said the bug may have been caught more quickly had Shreateh submitted a video showing the vulnerability or explaining it in more detail. Jones also claimed Shreateh merely sent a link to an account not belonging to him on which he'd posted a comment employing the bug, which broke the Facebook terms of service, since "exploiting bugs to impact real users is not acceptable behaviour for a white hat". He added that Facebook allows researchers to create test accounts, and that you must "make a good-faith effort to avoid privacy violations" in order to qualify for payment under the white-hat scheme.

This is all perfectly understandable, but since English isn't Shreateh's first language, perhaps something was lost in translation. Indeed, I'm led to understand that when you read the white-hat scheme guidance page in Arabic, the terms of service remain in English.

The harsh truth is that Shreateh was doing Facebook a favour by revealing to its security team a vulnerability it hadn't known about, and the team told him to go away, in effect dismissing his claim that this was a serious privacy bug.

Note that Shreateh didn't publish details of the vulnerability online before going to the security team. He did the right thing, the ethical thing, the thing Facebook and every other online service would want a researcher to do – he disclosed the vulnerability only to the people who could fix it.

I suspect the red-tape-bound, bureaucratic attitude the security team adopted was to do with embarrassment at being caught pants down. Such an attitude will only encourage researchers not to bother with ethical disclosure but rather to make far more money selling new vulnerabilities to the highest bidder on the zero-day market.

The story of how this farce unfolded can be found in Shreateh's own words on his blog at **http://tinyurl.com/llztdjv**.

CHROME CULPABILITY

I'm often astonished by the security stories that are blown out of proportion by the media and the online grapevine. A recent case in point is the furore over a blog post by a web designer, who casually pointed out that users of Google's Chrome browser could be putting themselves at risk by leaving their stored passwords exposed, quite literally, without realising it.

Before we consider whose fault this is, let's examine the technicalities. Like most browsers, Chrome wants to make your internet experience as easy as possible. In this competitive market, ease of use is one of the factors that can give your software an edge over someone else's in the struggle for market share. That's why all the major browsers offer to remember your

Khalil Shreateh exploited a Facebook vulnerability to post on Mark Zuckerberg's wall

passwords, so you don't need to enter them every time you log in to sites and services.

In other browsers, access to these passwords is protected by a master password, but not in Chrome: simply typing "chrome://settings/passwords" into the address bar will pop up your password store onscreen in nice, clear text for all to see.

Have you spotted the potential security risk here, folks? Actually, I bet a number of you haven't. It isn't that your passwords can be accessed in clear text simply by typing an easily found command into the browser; it's the fact you opted to allow ease of use to override the security of your data. You aren't compelled to allow Chrome to store your logins – whether password-protected or not – and disabling the function doesn't really make your life any more difficult or time-consuming. If you're seriously going to argue that the time lost installing a dedicated password manager such as LastPass or 1Password – which will securely encrypt your logins and require you to enter a strong master password to access them – will hamper your life to any noticeable extent, then you have more to worry about than your data.

Not that I think Google deserves to get away with this scot-free. At the very least, it should do the same as other browsers and provide a master password function to prevent casual access. Firefox supports a master password, but doesn't default to locking with it (which should change), while Internet Explorer and Safari require system password authentication. Admittedly, Justin Schuh, security engineer for Chrome, has a point when he claims that providing a master password lock gives users a false sense of security that may lead to "risky behaviour", by which I assume he means letting your browser store important information such as your online-banking details. Once someone has physical access to your computer hardware, he says, the jig is up – your online security is toast.

> You aren't compelled to allow Google to store your logins, password-protected or not

DAVEY WINDER
Award-winning journalist and small-business consultant specialising in privacy and security issues.

He's right, up to a point, but admitting that someone with physical access to your computer, and the knowledge of how to exploit that access, has many vectors of attack open to them doesn't mean that applying a master password wouldn't work 99% of the time. In most real-world cases, the attacker is a casual chancer in your office or home who has no idea how to get at your passwords other than by typing that command they saw on the internet. By putting no obstacle in the way of user authentication, and by adding a "password search" function to its login store, Chrome makes it too easy for a suspicious spouse or a nosy co-worker to find the information required to access your Facebook account in a matter of seconds while your machine is unattended.

Personally, I'd recommend that readers with family or friends who may be at risk from such snooping help them disable Chrome's auto-fill and password-store functions (you need to click on the advanced settings link at the bottom of the normal settings screen to access these). Also, it's worth spending the time to help them set up a proper password vault. Finally, simply activating a password-protected screensaver that pops up if you're inactive for 30 seconds can prevent most casual snooping.

BUY FOLLOWERS, BY ZEUS!

According to Greek mythology, Zeus was the father of gods and men, but over the past six years, the botnet, trojan and crime kit of the same name has become better known within the IT security world as the father of most malware. Since it burst onto the scene in July 2007, Zeus – or rather variations of the trojan created using the Zeus crime kit – has infected millions of computers. To date, more than 50,000 variations have been identified, which is a lot by any measure.

All these variants exist to do the same thing – steal your banking information. Zeus is clever enough to lie dormant after an infection and wait for the victim to visit an online-banking site, at which point it will leap into action, employing a host of techniques including keyloggers, screengrabbers, form-grabbers and even fake man-in-the-middle banking interfaces to steal your login credentials and access your financial accounts. Given that it's six years old and has such a high profile, you may think Zeus is on borrowed time. After all, every security vendor out there knows what to look for, even allowing for its mad variation count (they're all iterations of the same theme, so share similar fingerprints), and how to deny it access.

The trouble is, plenty of people consider themselves too savvy to get caught by malware – since they never click dodgy links or visit dodgy sites – or never consider security at all. This is why cybercriminals are still intent on using the proven-to-be-profitable Zeus, and are turning the social engineering crank in order to distribute it as widely as possible.

Bogus Facebook pages have been high on the distribution hit list for much of the year, employing the usual tactic of a subject matter (sports, current global news stories, celebs, sex) that will encourage the unwary to click a link purporting to provide more information or load a video, but which actually launches the Zeus executable.

However, it seems Zeus is changing tactics, focusing on the theft of banking credentials. The latest variants to come to my attention appear to target social media networks for "likes" and followers. This should come as no great surprise, if you remember that profit is the motive for distributing malware. Over the years, I've taken a professional interest in the value of stolen credit cards; by monitoring various underground "dark market" sites, I've watched that value fall and fall. In fact, "crash" would be a better word: even allowing for an anomaly that makes European credit cards five times as valuable as US ones, prices are at rock bottom. A verified, virgin card – that is, one whose owner doesn't know the details have been compromised – issued by a UK bank can cost as little as £5; buy in bulk, taking 50 stolen card account details, and the price will fall to £1 per card. In the US, such bulk deals bring the price down to a few pennies for each card.

Sure, active bank account details – with "guaranteed" balances to pilfer – and stolen PayPal accounts command far higher prices, but there's no escaping the fact that stealing financial data at this level isn't as profitable as it used to be; with so many criminals at it, the market is becoming saturated. Of course, savvy cybercriminals who can sniff out the emerging trends and create or tweak malware to take advantage of new niches are the ones who'll make the most money, which is why fake Instagram accounts are worth much more than stolen credit cards, and why Zeus variants are now appearing solely to hype such accounts by generating fake likes.

Likes are now being traded in bulk, with bundle deals for 1000 or more bringing down the price. The going rate seems to be $30 for 1000 Instagram likes or a tenner for 1000 followers. It's interesting to note that it's the social networks on the edge of the boom – up-and-comers that are starting to take off and so appeal to marketing types and businesses with an eye on the trendy demographic – that are being targeted, rather than Facebook and Twitter; the big two are being used, where possible, as the distribution channel, garnering clicks and creating zombies to add to the pool.

These infected computers, controlled by a central command server, are then used to post likes for certain pages and follow certain others. The operators of these Zeus-powered scams can use this brand-building power to show

The black-market value of stolen credit cards has fallen sharply

Likes are now being traded in bulk – the going rate seems to be $30 for 1000 on Instagram

that they could do the same for any interested customer – in other words, anyone looking for a shortcut to high social network visibility and the potential jackpot it promises.

Of course, whether anyone who dealt with such people would actually get to share in the fake-follower bonanza, or just end up another victim of identity theft and credit card fraud, is another matter altogether.

LAVABIT FALLS VICTIM TO PRISM

I was disturbed to read that two leading secure email providers have announced they're to close down, rather than continue at the mercy of the US government's draconian disclosure measures. Not only would these measures force providers to hand over access to secure email on demand, but they would also prevent them from telling anyone what had happened.

Lavabit was first to make a "close rather than disclose" statement, quickly followed by Silent Circle. Few email services encrypt everything with an asymmetric key and AES-256, making unauthorised decryption all but impossible. In order to decrypt messages, an attacker would have to compromise the server and know your password, something that the provider itself wouldn't be aware of.

Now, in case you didn't know, Prism/NSA whistleblower Edward Snowden was a Lavabit customer, but its founder Ladar Levison stressed that his decision to close wasn't taken to protect one user, but rather every user. Levison found himself between a rock and a hard place, since even talking about the demands being placed upon his service was against the law, yet not talking about them meant his customers wouldn't know that this supposedly secure system was actually rather insecure after all. I applaud Levison for closing the service and bringing this situation to the attention of the media, albeit without detailing any particular "orders" that may been served by the US government.

By doing so, Levison has highlighted the absurdity of the scenario, but it seems he has also put his own liberty in question. This surreal and ridiculous situation is about to become worse, since, as I write, it appears the US government has threatened Levison with criminal charges for deciding to close his business; apparently, doing so is a violation of an order to provide information that prevents him from not providing that information. Folks, forget the "nothing to fear if you've nothing to hide" nonsense – now is the time to explore DIY encryption for your email...

DDOS DATA

[illegible] focuses on distributed denial-of-service (DDoS) threats, rather than the [illegible] of enterprises surveyed experienced a DDoS attack in the past year; 50% have DDoS protection as part of their risk-management strategy. Most worryingly, the average size of a DDoS attack has increased 43%, to 2.12Gbits/sec, on the year before.

DVD CONTENTS

GAMES, ESSENTIALS, FULL SOFTWARE, DRIVERS & MORE!

Each issue, we aim to provide all *PC & Tech Authority* readers with a full suite of simple yet important applications, along with a variety of extended trials and full programs that are both useful and interesting.

This month, we've put together a range of security applications, making this disc your one-stop shop for securing your PC. We have firewalls, anti-virus, password controllers, and much, much more.

Plus we have the handy Tails Linux OS, which you can run from a USB drive or DVD.

That's it for this month – as always, please send any feedback and suggestions to dvd@pctechauthority.com.au

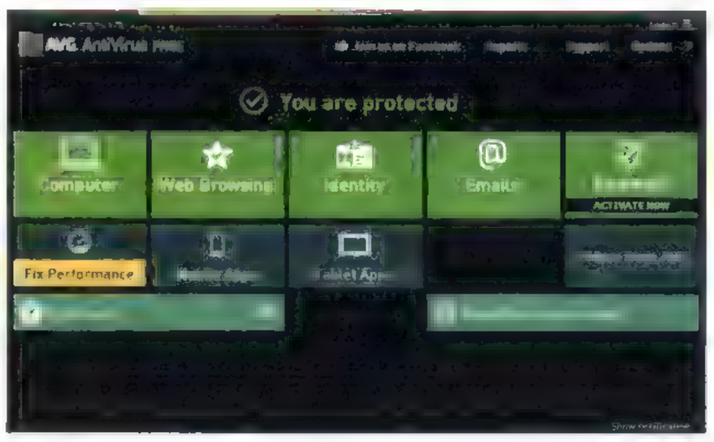
We'd love to hear any suggestions you have for improving our DVD.

COMPLETE SECURITY TOOLKIT!

Adaware Free Antivirus+

Leaner, meaner, faster. Ad-Aware Free Antivirus+ combines our legendary Anti-spyware with a super fast, free Antivirus. It now features download protection (blocks malicious files before being written to disk), sandboxing (keeps unknown apps running in a virtual environment) and advanced detection - it's our most powerful free antivirus yet.

AVG Antivirus Free 2014



AVG AntiVirus 2013 offers real-time protection against today's most sophisticated threats. You can chat, download and exchange files with confidence; play games and watch videos without worry or interruption; download, share files and send messages safely; enjoy your life on social networks, or surf and search with real-time protection.

Avira Free Antivirus

Discover our award-winning free antivirus software, which removes malware and protects you against the latest strains of viruses, worms, Trojans and more. Together with the Avira Searchfree Toolbar, it not only keeps your PC clean, it also enhances your privacy and empowers you to safely surf the web.

Comodo Firewall

One of the first steps in securing a computer is downloading and activating a quality firewall to repel intruders. Only this free firewall software has access to Comodo's extensive safe-list of PC-friendly applications, a key component of Default Deny Protection.

Comodo Internet Security

Comodo Internet Security is the free, multi-layered security application that keeps hackers out and personal information in. Built from the ground upwards with your security in mind, Internet Security offers 360° protection by combining powerful Antivirus protection, an enterprise class packet filtering firewall, advanced host intrusion prevention and automatic sandboxing of unknown files.

Unlike the stripped down versions of commercial software that other software vendors offer for free, this is the full, completely functional version of the product.

Dashlane

Keeping track of passwords and making them secure is startlingly simple with Dashlane's free password manager. Automatically import your passwords from Chrome or any other browser into your secure password vault. Save any missing passwords as you browse. Make a new password right within your browser. Get automatic alerts when websites get breached.

IOBit Malware Fighter 2

IObit Malware Fighter 2 Free is an advanced malware & spyware removal utility that detects and removes the deepest infections, and protects your PC from malicious behaviour in real time. With a unique "Dual-Core" anti-malware engine, it's able to detect the most complex and deepest malware, like spyware, adware, trojans, keyloggers, bots, worms, and hijackers, in a fast and efficient way!

McAfee Stinger

McAfee Stinger is a standalone utility used to detect and remove specific viruses. It is not a substitute for full anti-virus protection, but a specialised tool to assist

DID YOU KNOW?

You can find a guide to using ISO files in the Editorial section of the DVD

administrators and users when dealing with an infected system. Stinger utilises next-generation scan technology, including rootkit scanning, and scan performance optimisations. It detects and removes threats identified under the "Threat List" option under Advanced menu options.

RoboForm

It's now easier than ever to log in to your favourite websites and applications. RoboForm makes the process effortless by automatically saving then entering your usernames and passwords. Simply click and log in – similar to a browser bookmark! You'll never need to remember or type another password again.

Spyware Blaster

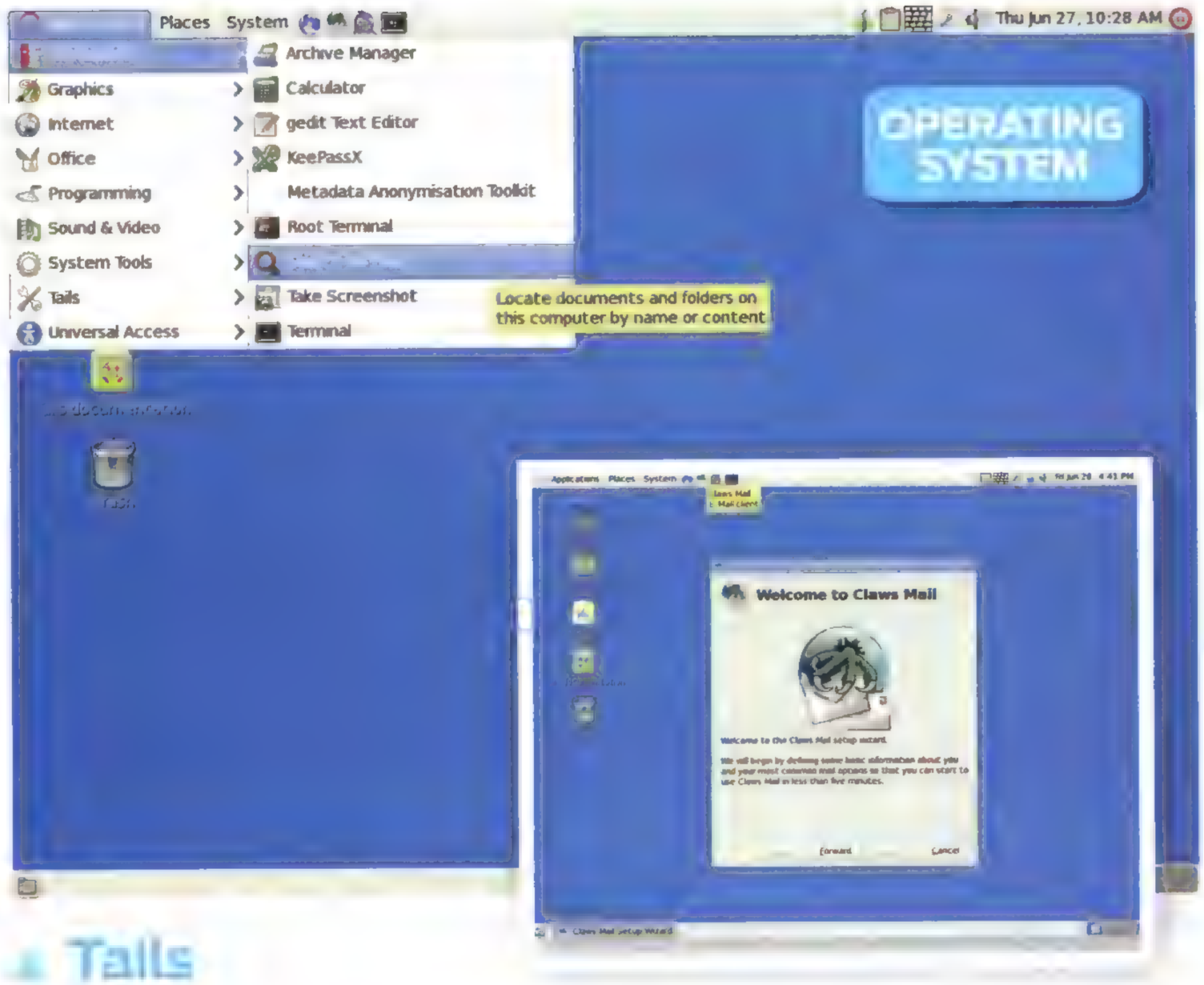
Spyware, adware, browser hijackers, and diallers are some of the most annoying and pervasive threats on the Internet today. By simply browsing a web page, you could find your computer to be the brand-new host of one of these unwanted fiends!

Tiny Wall

TinyWall does not annoy you with popups at all, yet it is still extremely easy to add exceptions to your firewall rules. TinyWall actively blocks hundreds of trojans, viruses and worms. TinyWall does not require you to know about ports, protocols and application details.

Tor Browser

The Tor software protects you by bouncing your communications around a distributed network of relays run by volunteers all around the world: it prevents somebody watching your Internet connection from learning what sites you visit, it prevents the sites you visit from learning your physical location, and it lets you access sites which are blocked.



Tails

Tails is a live operating system, that you can start on almost any computer from a DVD or a USB stick. It aims at preserving your privacy and anonymity, and helps you to:

- Use the Internet anonymously and circumvent censorship;
- All connections to the Internet are forced to go through the Tor network;
- Leave no trace on the computer you are using unless you ask it explicitly;
- Use state-of-the-art cryptographic tools to encrypt your files, emails and instant messaging.

PC & TECH AUTHORITY

DVD CONTENTS

No 193 / December 2013

WINDOWS 7Zip · CCleaner · CutePDF Writer · Defraggler · Foxit Reader · Apple iTunes · Malwarebytes Anti-Malware · Open Office · Sandboxie · Songbird · Spybot Search & Destroy · Teracopy · VLC Media Player · WinRAR · WinZip · Avast Free Antivirus, AVG AntiVirus Free Edition 2011, PC Tools AntiVirus Free **INTERNET** AOL Instant Messenger · Vuze · Google Chrome · Dropbox · Feed Reader · Filezilla · Internet Explorer · Microsoft Security Essentials · Mozilla Firefox · Mozilla Thunderbird · Skype · Steam · ZoneAlarm **DRIVERS** ATI · Nvidia, Direct X · Realtek Audio Codecs · VIA Hyperion Drivers **LINUX** Tails · **FEATURE** Adaware Free Antivirus+ · AVG Antivirus Free 2014 · Avira Free Antivirus · Comodo Firewall · Comodo Internet Security · Dashlane · IOBit Malware Fighter 2 · McAfee Stinger · RoboForm · Spyware Blaster · Tiny Wall · Tor Browser **EDITORIAL** Burning an ISO Image

INSTRUCTIONS: Open Windows Explorer, navigate to your DVD drive and double-click Index.html in the root directory. **DISC PROBLEMS:** To replace faulty DVDs, please send the discs to: *PC&Tech Authority* DVD Replacements, R50 Victoria St, McMahon's Point NSW 2060

Make sure to include your name and postal address on the back of the package so that we know where to send the replacements. For all other DVD related issues email **cd@pcauthority.com.au**. As the delivery platform only, *PC&TA* and Haymarket Media cannot and will not provide support for any of the software or data contained on these discs. Although all discs are virus scanned, Haymarket Media cannot accept any responsibility for any loss, damage or disruption to your data or computer system that may occur while using the discs, the programs or the data on them. There are no explicit or implied warranties for any of the software products on the discs. Use of these discs is strictly at your own risk.

Input Output

DAN RUTTER BRINGS THE ANSWERS TO YOUR QUESTIONS LIKE NO-ONE ELSE CAN

SLIGHTLY LESS LOCAL AREA NETWORK

Is it safe to run a network cable to your neighbour?

I'd like to share my local network with my next-door neighbour, but Wi-Fi is really flaky between us. I presume I could make it work with a directional antenna, but our walls are spitting distance apart, so I could really easily just string an Ethernet cable across.

I vaguely remember reading about this being a very bad idea for important electrical reasons, but I can't remember why. Is it?

Hannah O'Neill

In the olden days, when consumer Ethernet meant 10Base2 over coaxial cable, it was indeed a dreadful idea to string network cables between buildings. The shield on 10Base2 is earthed; earths in different premises can be at different potentials, and all sorts of weirdness could result. It wasn't really a *huge* electrocution or fire risk, but my definition of "huge" and yours may not be the same. If "in a hundred years, who's gonna care?" does not sum up your attitude to immediate risks, I suggest you seek a second opinion about any of my advice.

Today, ordinary Ethernet cables are all Unshielded Twisted Pair (UTP), which as the name suggests has no shield, and no earth conductor. It's hardly best network-engineering practice to hang one out the window, and a bare Cat5 cable waving in the breeze may not survive a great deal of weather. But the only real danger it poses is just barely possibly allowing a major electrical fault in one building to fry a computer in the other.

If you're running network cables in conduit through a building then you want to get special "plenum-rated" cable that, most importantly, won't carry *fire* through the conduit like a fuse. This may also invalidate some aspect of your insurance in some way. But in your situation, I would *totally* just fish some cable through a garden hose or something for protection, tape it in place, and call it good.

I must remind you, however, that my advice is not always entirely reliable.

JAMMED FANS

Yesterday I discovered the reason why my computer had been slow was that a drive power cable had kinked into the CPU fan and jammed it, and the processor was thermal throttling all the time.

I taped the cable away from the CPU and all was fine again, but the computer had been like this for days. Does this mean I need a new CPU fan? It seems to be working OK, but I can't believe being stuck for DAYS ON END could have done it any good.

I killed a cheap cordless drill once by repeatedly grinding it to a halt while using a hole saw, and I vaguely remember giving my Tamiya Hot Shot full throttle when the wheels were jammed with rocks was a really bad idea too. Is it just a power thing, with the drill and model car motors being much more powerful than the CPU fan one? Is it superior modern technology?

Should I get a new CPU fan just to be safe?

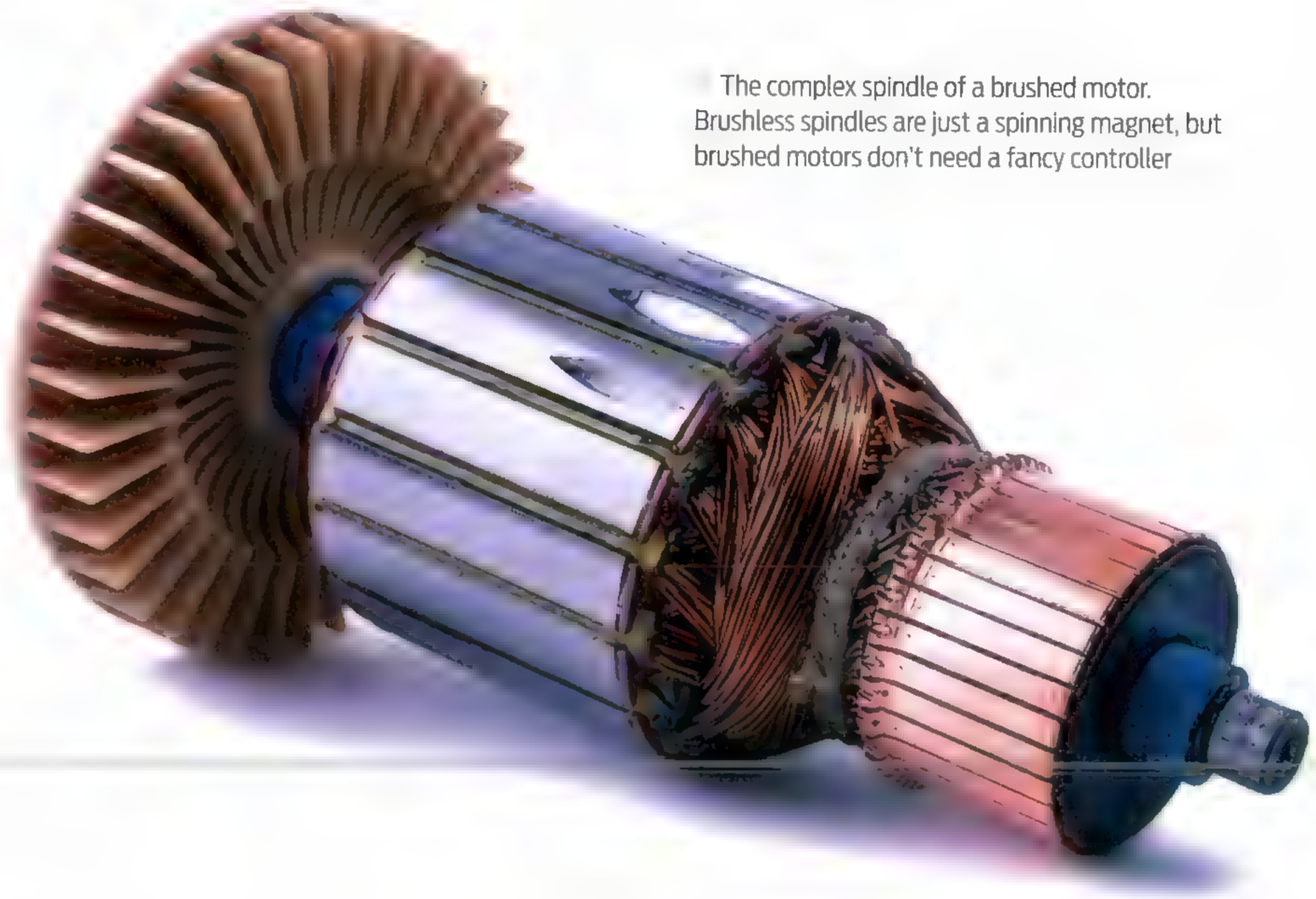
Liam Crooke

Your CPU fan is almost certainly perfectly undamaged, because it's fundamentally different from the ones in cordless tools and R/C cars. Well, to the ones in older and/or cheaper tools and cars, at any rate.

Computer-fan motors are all "brushless", with a spinning permanent magnet that's rotated by a series of electromagnet coils that're energised sequentially, so the energised coils are always the right ones to pull the magnet along. They need controller electronics to accomplish this feat.

Simple high-power direct-current motors, on the other hand, are "brushed" motors, with stationary magnets and spinning coils. The coils are energised by a slotted "commutator" on the spindle, onto which the titular "brushes" – actually, little sintered blocks based on graphite or copper – are pushed by springs.

Brush motors are cheap and simple to use. Just connect them to a DC voltage with two wires and



The complex spindle of a brushed motor. Brushless spindles are just a spinning magnet, but brushed motors don't need a fancy controller

they spin. Reverse the voltage, they spin the other way. But they develop maximum torque – and draw maximum electrical power – when they're not moving at all. This is usually a stuck-drill or jammed-wheels situation where battery-punishing, wire-smoking, gear-stripping maximum torque is exactly what you do *not* want.

Brushless motors draw a bit more power when stalled than when turning, but typically not enough to do any harm, and their control circuitry seldom has a problem with being stalled. Low-powered brushless motor drivers are also quite simple and cheap to make – especially if, as in computer fans, you only want the motor to spin one way. And there are no brushes and commutator to wear out. So they're a good choice for computer fans.

High-powered brushless motors have been around for some time as well, but until quite recently they've been too expensive for normal hobby and cordless-tool applications. That's changing now. R/C hobbyists will soon be robbed of the thrill of changing out worn brushes, and cordless-tool users will no longer enjoy the smell of commutator-spark ozone.

CPU CRUELTY

I As the weather warms up, my old (2009) overclocked PC (Win7 64 bit, Core i7 920 at 3.5GHz) is becoming flaky. The system periodically hangs, usually at a moment when a new task or something suddenly starts – something as simple as opening a new browser window can do it, though running games strangely seldom seems to.

I figured more errors with more temperature indicated a cooling problem, so as you've recommended for diagnosing this I took the side off the case and pointed a big desk fan in there. It maybe helped a bit, but not a lot. And just today, I started getting these magnificent bluescreen errors that aren't there quite long enough for me to write them down (I'll photograph the next one!) but which include the terms "clock interrupt" "secondary processor" and "time interval".

"Secondary processor"? Is that the GPU or something? Can you give me a pointer on what to try first?

Leo Whitehead

O The error you're getting is an absolutely classic "over-overclocked CPU" bluescreen. It can mean other things, but given the computer you're using, the probable culprits are CPU first and power supply a distant second, only because a flaky PSU can cause almost anything.

What is probably happening is that after years of higher current blowing conductive atoms down the minuscule wires of your CPU (which is actually a real thing that happens), the processor's becoming marginal at its above-spec speed. It's easy to see if this is the case; just go into BIOS setup and return the CPU to its default speed and voltage and see if the problem clears up.

If you now want more CPU speed than you can get at stock, you'll need a new CPU, and LGA 1366 CPUs like yours can no longer be had new for reasonable prices. There are plenty of cheap used ones out there, but they may be in worse shape than the one you've already got. So the most sensible solution at the moment, if slowing the CPU down cures the crashes, is to just live with your stock-speed 920 and save for a big upgrade.

IF YOU HAVE A QUESTION FOR DAN RUTTER, SEND HIM AN EMAIL AT IO@ATOMICMPC.COM.AU, AND HE'LL TRY TO FIND A SOLUTION FOR YOU.

I/O OF THE MONTH

HDMI TO VGA TO COMPOSITE TO RF MODULATOR...

I wanted to use an old 19-inch LCD with only a "VGA" input socket as a second monitor, and my graphics card has no HDMI output. So I bought an HDMI to VGA cable for three bucks on eBay and... it doesn't work. Might as well not be plugged in at all.

The other output on my graphics card is DVI, so I got an HDMI to DVI cable and used it to plug the second output into my main monitor, and that worked. So now I'm thinking that maybe I need to leave the main monitor plugged into the HDMI output and get a DVI to VGA to make the second monitor work. Before I make an eBay cable emporium slightly richer again, though, will this actually work? What was the problem with the FIRST cable?

Nikolas B

O The detail you're missing here, which cheapo cable vendors do not often clearly explain, is that there is no way at all for a mere cable to connect an HDMI output to an analogue "VGA" monitor. Some digital video connectors have pins that can carry an analogue signal in parallel with the digital, but HDMI, like the newer DisplayPort, does not. An HDMI cable can carry digital audio along with digital video, but not analogue video. You'd need an active converter box to turn HDMI into VGA; a good one of those would cost you more than a new 19-inch monitor.

DVI can deliver an analogue signal on the fourpins with a cross in the middle on one side of the connector. Only the "DVI-I" version of DVI actually has those pins. If your video card has the pins, you can plug in a DVI-to-VGA cable and run an old monitor, subject to the monitor's resolution and refresh-rate limitations. Otherwise, you can't. HDMI is, signal-wise, very similar to DVI – which is why HDMI-to-DVI cables work – but only on the digital side. There is no analogue HDMI option.

So, you are probably now wondering what the heck are people doing selling HDMI-to-VGA cables on eBay? As far as I can see, they're trolling for suckers.

There are some weird industrial and other non-standard devices that actually accept HDMI data on some rewired version of the 15-pin D-sub "VGA" connector, but almost everybody who buys one of these cables is probably trying to do what you tried to do, and is doomed to failure. Or worse, if the non-standard cable connects a voltage on one pin to a ground on the other, you're gonna have a bad time.

www.pcandtechauthority.com.au December 013 **101**

End of the line for XP

SIMON JONES EXPLAINS WHAT TO DO BEFORE SUPPORT FOR WINDOWS XP ENDS NEXT YEAR, AND REVEALS YET MORE USEFUL POWERPIVOT TIPS

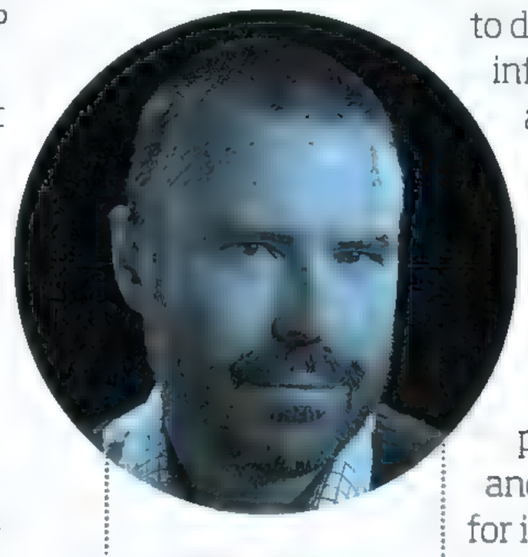
All good things come to an end, and so it is with software support: April 2014 sees the end of support for Windows XP, Windows Server 2003, Exchange Server 2003, Small Business Server 2003 and Office 2003.

By then, the 2003 wave of products will be 11 years old, and Windows XP will be 13. Office XP ran out of support in December 2011, but Windows XP's lifecycle was extended a couple of times because people stubbornly refused to move away from it. Anyway, at T-minus seven months and counting, what exactly does "end of support" entail? Should you be worried, and what are your options?

Microsoft provides three levels of support for its software products: Mainstream Support, Extended Support and Online Self-Help Support. The Support Lifecycle policy is reasonably flexible, but generally it offers ten years of support for business and developer products (five years' Mainstream and five years' Extended) and five years of Mainstream Support for consumer and multimedia products. The main difference between Mainstream and Extended Support is that only bugs relating to security will be fixed during Extended Support – non-security bugs will only be fixed for customers who have purchased extended hot-fix agreements within 90 days of Mainstream Support ending. Once Extended Support ends, you're on your own. Microsoft commits to maintaining Online Self-Help Support for ten years for most business and developer products, but since Office 2003 and Windows XP are already older than that, these knowledgebase articles could start disappearing at any time.

With about a third of all PCs in the world still running Windows XP, it's highly unlikely that Microsoft will remove all the patches for it from Windows Update yet, but there won't be any more arriving. If anyone in a black hat finds a new security hole to exploit, Microsoft isn't going to be doing anything about it in future. Security holes in Windows and Office aren't rare, as you can tell from the regular stream of patches that appears on the second Tuesday of every month. Once Windows XP and Office 2003 go out of support, there won't be any more patches for those products, and the likelihood of your PC catching something nasty will increase, no matter how good your antivirus software.

End of support for Windows XP means a greater risk of infection



SIMON JONES
An independent IT consultant specialising in Office Automation, Visual Basic and SQL Server.

We can't know by what factor it will increase, but around a third of malware infections can be traced to missing security patches; that is, if the computer had been kept up to date, it wouldn't have become infected. Even though infections and virus threats are increasingly common – up 182% year on year in 2012 – Windows 7 is still far less likely to be infected than Windows XP if you're running anti-malware protection; if you don't have real-time malware protection in place, Windows XP and Windows 7 are about on a par for infection rates. Windows 8 comes with real-time protection built in and turned on by default, so its infection rates are incredibly low – you'd have to consciously turn off Windows Defender to reach any significant infection rate.

The headline figures for the second half of 2012 were that protected Windows XP SP2 computers had 4.2 infections per thousand, while 32-bit Windows 8 machines and 64-bit Windows 8 machines had 0.5 and 0.2 infections per thousand respectively. With no real-time anti-malware installed, these figures went up to 15.6 per thousand for Windows XP and 2.7 per thousand for 64-bit Windows 8 (no data is provided for 32-bit Windows 8). These figures are a summary of the telemetry data from Microsoft's Malicious Software Removal Tool (MSRT), which is run on millions of computers every Patch Tuesday. See more of them in Microsoft Security Intelligence Report Volume 14 at **www.pcpro.co.uk/links/230oa1**.

Operating systems at 64-bit are substantially more secure than their 32-bit equivalents, with the exception of Windows Vista, for reasons that aren't clear. It's interesting how relatively insecure Windows 7 RTM compares to Vista SP2 or Windows 7 SP1, but it's blindingly obvious that Windows 8 is far more secure than any previous version of the operating system.

Security patches that are released for more up-to-date versions of Windows and Office will probably be reverse-engineered by malware writers to see whether Windows XP and Office 2003 share the same vulnerabilities; if they do, those old products will become even more at risk, since their now-known holes will surely be exploited.

Eventually, there will be fewer computers in the field using this obsolete operating software. Fewer pieces of malware will be written to target their vulnerabilities, and fewer instances of that malware will be in circulation. This kind of "security by obscurity" (which is often claimed by Mac aficionados) is a long way off yet, however, and you shouldn't be sitting on your hands in the meantime.

I know many personal users and small businesses belong to the "if it ain't broke, don't fix it" school of thought. Why should they spend money on new computers, software or operating systems when what they have works perfectly well for them? I understand and sympathise with this attitude, but we're rapidly reaching a point where the risks aren't worth it. If a fire took out your company's offices and destroyed your paper records – the only records you had – you wouldn't know, and certainly couldn't prove, who owed you what money, and you'd go out of business. If you had computer records, you'd be in the same boat if you lost those computers in a fire and didn't have off-site backups.

The bad news is that a serious malware infection can wreak much the same havoc: it can hold your data to ransom by hiding your files, only giving them back if you pay the malware's writers for "support". It can also infect your backup files so that the infection will return after you've rebuilt your computers and reinstalled your backups. Such an infection can slow your machine to a crawl, and if it starts sending spam or virus emails from your machine, your legitimate emails risk being refused by the recipients' email servers because you've been blacklisted as a spammer. All these things can hamper or cripple your business for days or weeks.

Good antivirus software can only do so much, and fully patched software and operating systems are essential to keep your computers and business running. You must move off Windows XP, Server 2003, Small Business Server 2003 and Office 2003 before next April's deadline. In order to upgrade to Office 2013 you must move to Windows 7 or 8 anyway, and if you're running a version of Office before 2003 – Office XP, 2000, 97, or 95 – then you're already way beyond support.

A computer is far more like a car than a filing cabinet, in the sense that it needs regular maintenance and servicing: you can't expect it to keep working year after year if you don't look after it properly. Think of it this way – you have around six months before your garage says they won't be servicing your car any more. Its steering and brakes might be knackered, its seatbelts frayed and its air bags absent, but since the manufacturer isn't making the parts anymore, you're going to have to do something or take the risk of crashing and losing everything.

Many old computers could be successfully upgraded to run Windows 7 or 8 – perhaps with the addition of a little more RAM – but it may not be economically viable to keep them chugging along for another year or two: you'd get a much faster machine more cheaply if you bought a new computer. If you've already upgraded your computer but are still running an old version of Office, you could upgrade to a later version or switch to a different product.

Remember: if your copy of Office came preinstalled on a new computer, you can't legally transfer its licence to another computer. The same is true for Key Card licences. That's why OEM and Key Card licences are so cheap – they're tied to the one computer and must die with it; if you replace the computer, you have to buy Office again. (As such, I don't recommend buying OEM or Key Card licences, even on the tightest budget.)

Perhaps you have a software compatibility problem, a peculiar application that refuses to run on a more modern version of an operating system, or a document or template that's locked to an old version of Office. Your first port of call for an old application should be Windows compatibility settings. Right-click on the application and choose Properties from the menu; select the Compatibility tab, and either run the troubleshooter or manually set the compatibility mode to an earlier operating system version. You can also increase the application's privileges by running it as Administrator. The Windows Compatibility Center (**http://tinyurl.com/k5u9jar**) enables you to search for your software and check what options are available – the manufacturer may have released a patch or some instructions on how to run the software on a newer OS version. You might also consider running it in a virtual PC that's turned on only when necessary. That's still a security risk, but less of a risk than running your entire operation on an

OS support deadlines

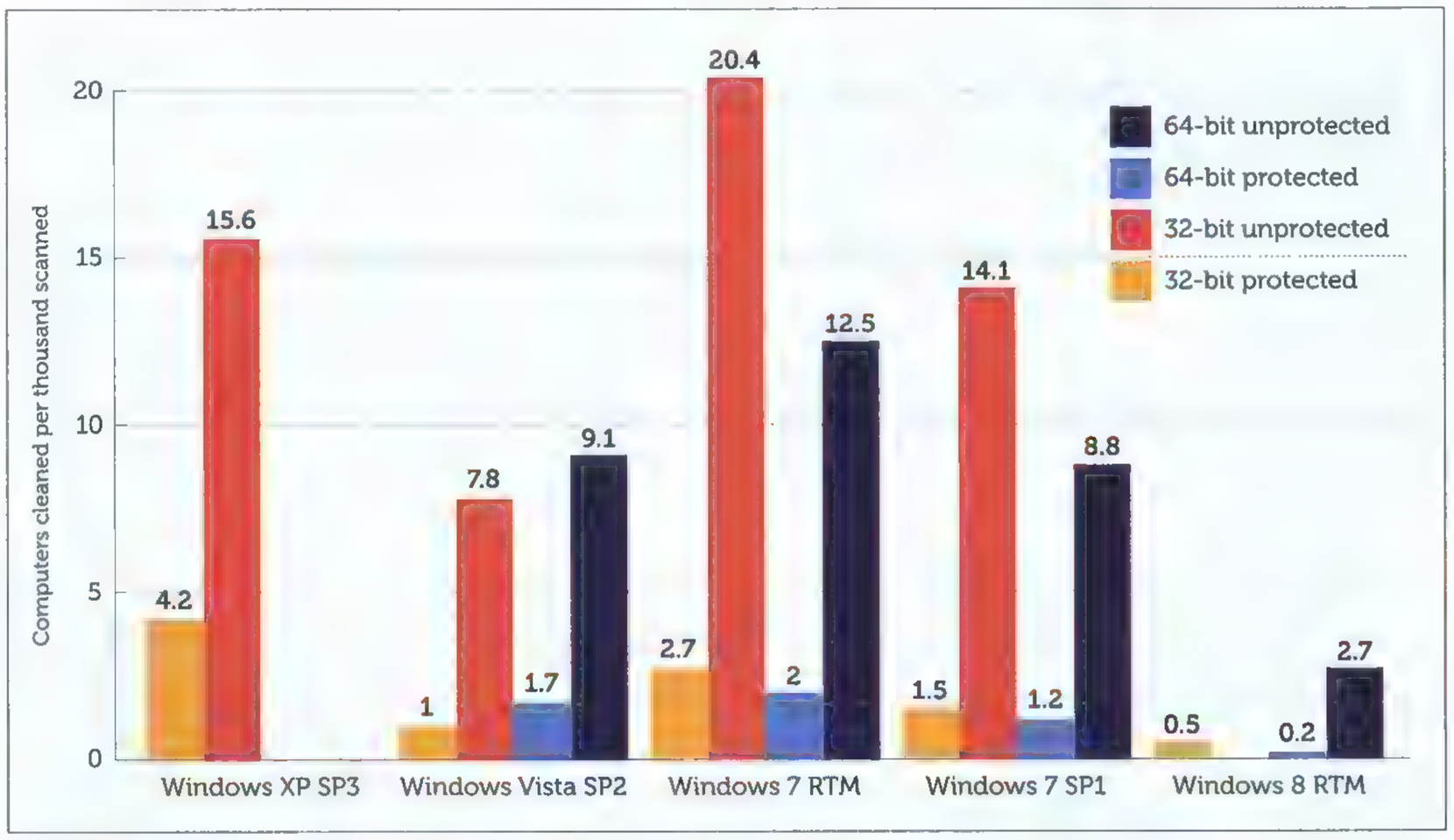
	Mainstream	Extended
Windows XP	April 2009	April 2014
Windows Vista	April 2012	April 2017
Windows 7	January 2015	January 2020
Windows 8	January 2019	January 2023

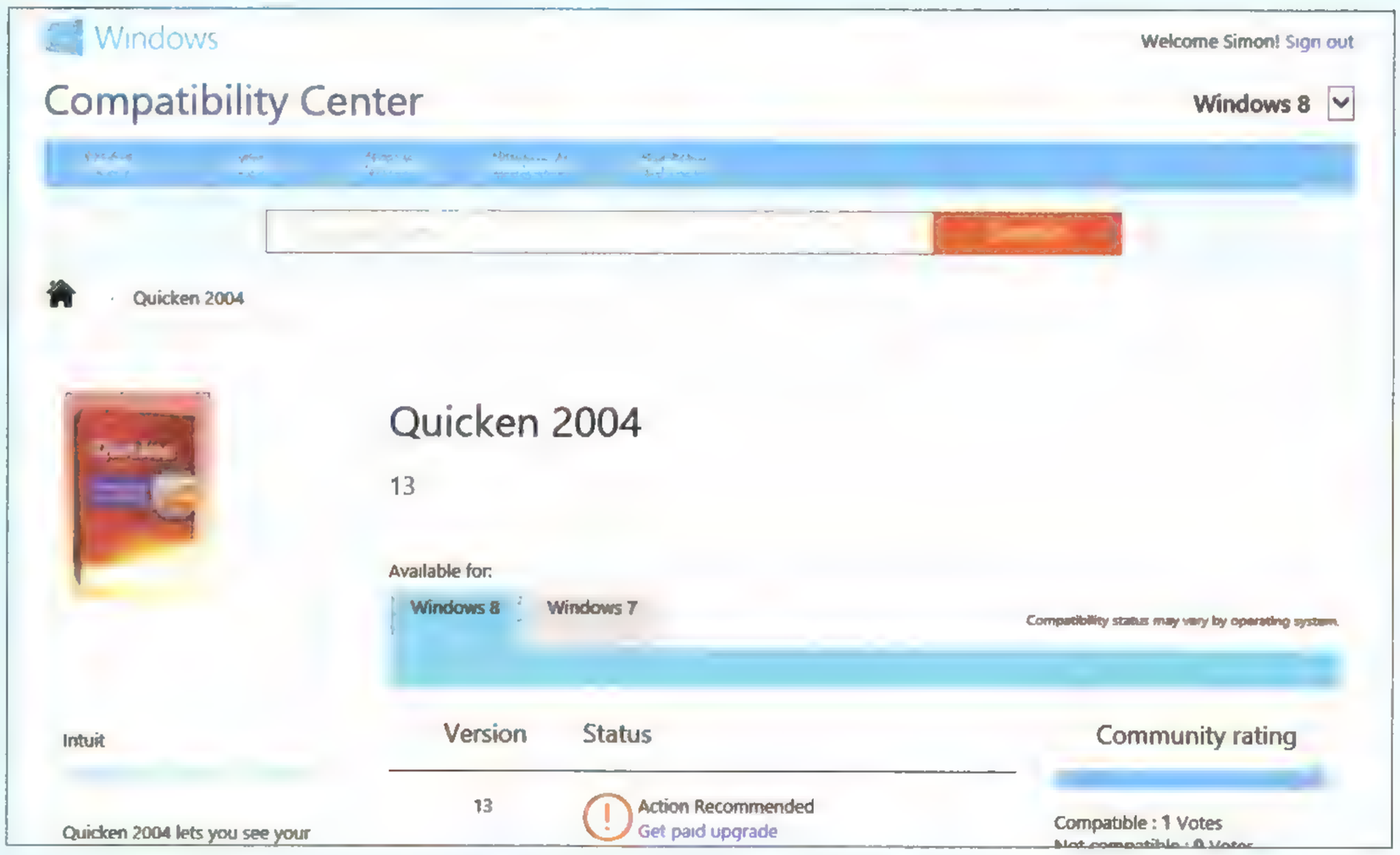
Software support deadlines

	Mainstream	Extended
Office 95	December 2001	N/A
Office 97	August 2001	January 2004
Office 2000	June 2004	July 2009
Office XP	July 2006	July 2011
Office 2003	April 2009	April 2014
Office 2007	October 2012	April 2017
Office 2010	October 2015	October 2020
Office 2011 Mac	January 2016	N/A
Office 2013	April 2018	April 2023
Office 365	Ongoing	N/A

> Around a third of malware infections can be traced to missing security patches

Malware infection rates for July to December 2012, as reported by Microsoft





If you're having problems with outdated software, consult the Windows Compatibility Center

obsolete platform.

If you can't make any of these options work for you, you're probably going to have to invest some time – and money – to replace the incompatible dinosaur with something more modern. If you're in a business with five or more PCs, you should consider volume licences. You'll pay less than you would buying the software off the shelf in a shop, and you can spread the cost over three years. Everyone – businesses and home users alike – should be looking at Office 365 subscriptions, where you pay monthly or yearly rather than buying the licence outright. In a bid to push customers towards a subscription model, Microsoft has made a standard Office 2013 licence expensive compared to an Office 365 subscription, despite the fact you get much more with Office 365 and support for it doesn't end next year. Subscription licences, and volume licences with Software Assurance, include the cost of the next version in the amount you pay, so you're always kept up to date with the latest version of Office and never run out of security patches.

If you can't afford to buy Office 2013 or Office 365 subscriptions and your needs aren't that demanding, another option is LibreOffice, which is free, or Ability Office, which costs US$40 for the standard version and $45 for the professional package. These programs are sufficient for most users, but you may come across formatting problems from time to time, where what you see isn't quite what the originator of the document intended.

If you think you're capable of handling the OS upgrade yourself, go ahead. If you don't, or you're not sure what's involved, find yourself a local IT consultant who can examine your setup, advise you what it will cost and complete the job for you. Whatever you choose to do, do something – or accept, like the owner of a classic car, that you're going to have to be prepared for it to crash and burn at any moment, and that if it does, you're on your own.

POWERPIVOT ESSENTIALS III

Last month I wrote about the SAMEPERIODLASTYEAR() function (see issue 192, p100), which you can use with the CALCULATE() function in PowerPivot to compare figures from one year to those of the previous year.

I was talking about this to a colleague, and he asked me whether there are other functions he could use to compare figures on a month to month or quarter to quarter basis for extra flexibility. The answer is yes – there's a PARALLELPERIOD() function that does just that. Instead of taking just the date column as its parameter, PARALLELPERIOD() adds two extra parameters, for the number of intervals and the interval type. The interval type can be Year, Month or Quarter, and the number can be positive or negative, so you can go forwards or backwards in time. To calculate figures for two months ago, for example, you would use:

```
Prior Count:=
CALCULATE([Inspection
Count],PARALLELPERIOD
(Calendar[DateKey],
-2, MONTH))
```

There are also simple functions for PREVIOUSMONTH(), PREVIOUSYEAR() and PREVIOUSQUARTER() and NEXTMONTH(), NEXTYEAR(), NEXTQUARTER(). Sadly, however, there aren't any date functions to do with week numbers, and the support for non-standard fiscal years is shallow. However, if your financial year doesn't end on 30 June, you can specify it in some of the date functions, such as TOTALYTD():

```
Running Total:=
TOTALYTD(Sales[InvoiceTotal],
Calendar[DateKey], "May 30")
```

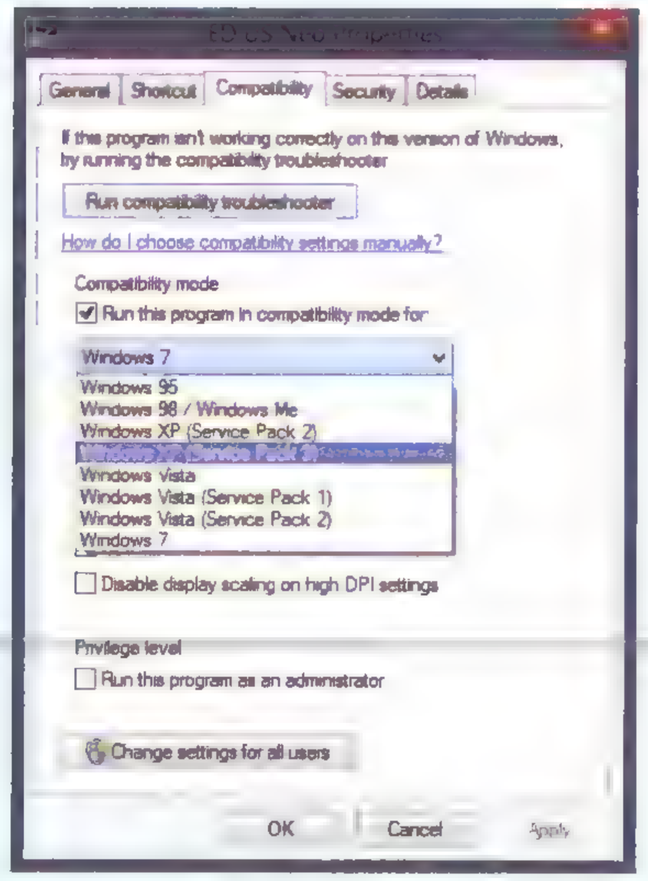
If you want to calculate anything more sophisticated, such as your own fiscal calendar week, month or quarter numbers, you'll have to calculate them once and store them in your Calendar table.

Another function that can be very useful is RELATED(), which follows the relationships between tables to bring related data from one table into another, or to filter and calculate values based on data in other tables.

For example, if you had a table of products that was related to separate tables containing product types and product sub-types, you could simplify the model for your users by bringing the type and sub-type data into the Products table. In a blank column in the Products table, simply type =RELATED(SubTypes[Description]) and name the column SubType, then do the same for the Types table's Description column.

Now all your Products have Type and SubType information held within the Products table, so you can hide the Type and SubType tables from the users entirely. Simplifying the model in this way will make it easier for end users to report on the data they want without having to constantly ask the IT department for help. This is what self-service business intelligence is all about.

> Volume licences include the cost of the next version, so you're always kept up to date



You can examine an application's compatibility options via the Properties menu

Judging Ballmer's game

JON HONEYBALL LOOKS BACK AT THE STAGNANT CULTURE OF BALLMER'S MICROSOFT, AND STILL HOLDS OUT HOPE FOR HIS LEAP MOTION CONTROLLER

The unimaginable has happened: Steve Ballmer has thrown in the towel and announced that he's going to leave. It will be some time over the next 12 months, depending upon how quickly an appropriate successor can be found. I can't let this momentous event pass without comment: as boss of the company, Ballmer must ultimately take responsibility for everything Microsoft does. However, only a fool would assume that he was party to every single decision, every small choice that could have made the difference between success and failure.

Bill Gates did have that obsessive attention to detail, and so it would be easy – too easy – to suggest that Bill was strong where Ballmer was weak. That would be very wrong. Back in the 1990s, I myself knew every Microsoft product, and almost without exception knew it inside out: Exchange Server, SQL Server, Windows Server, Office, the Windows desktop and all the development tools. This was the whole extent of the company's product offering back then (if you ignore a few esoteric oddities, such as the mainframe terminal application). So Bill could spend half a day looking at every major product group every single week, and retain a detailed and intimate view of what was happening.

During the noughties, there was a veritable explosion of products and SKUs (stock keeping units, that is, versions of products). It was no longer possible to remain wise about the entire product set. Indeed, it became hard enough even to remember everything on offer and what it did, let alone to have any competency in using it. And if it was hard for me, it would have been near impossible for the historically thin layer of upper management inside Microsoft. This is why the firm became fat and top-heavy during this time: too many managers, too many programs, too much stuff going on.

With this fatness came slowness and lethargy, and an almost terrifying momentum from both the Windows and Office groups. Despite all their best efforts at screwing things up (such as XP Home lacking any default security features, the Longhorn disasters, Office 2007 for Mac having no macro language), both groups could still steamroller through the decade on sheer inertial force – and all the while, Ballmer was in the captain's chair, steering this supertanker as it expanded, embraced and extended. No matter that it kept coming late to every new market niche, the sheer momentum of the beast was enough to drag everyone onboard in the end. After all, all you needed was Office Plus Five. This quasi-religious belief made it almost impossible to imagine a world in which Office wasn't central to the lives of computer users...

> Microsoft's management had been believing their own hype for one year too many

But before you could shout "pirates at 10 o'clock", the Good Ship Microsoft had been boarded and found itself aground in shallow water. Along came Google, which sucked all the revenue out of search and advertising. Along came Amazon, which did the same to e-commerce. And then Facebook stuck it to the company in the person-to-person communications arena. Finally, along came that pesky Apple and turned the whole mobile and tablet world on its head (all the better to shake all the money out of its pockets).

Suddenly, it became horribly clear that Microsoft's soft, lazy and risk-averse middle management had been believing their own hype for one year too many, and had seriously dropped the ball. No amount of panic work on things such as Windows Phone and Windows 8 could persuade the public that Microsoft was still in charge, that it was leading from the front. On the contrary, Microsoft was now stuck in catch-up mode, and in a business where being third isn't a place you want to be. Couple that with Redmond's still-prevailing, inward-looking mindset, and you have to ask yourself this question: given that there are hundreds of millions of iOS and Android mobile devices out there, why is there still no Office for those platforms?

The blame for this situation must lie squarely with Ballmer. Let's quietly pass over the two years he spent working at Proctor & Gamble as an assistant product manager after he graduated from Harvard. After that, he joined Microsoft as its 30th employee, and he's stayed there ever since. The steep rise in Microsoft's sales revenues throughout the 2000s is mostly down to the work he did alongside Gates in the 1990s – but the current train wreck is down to the work he didn't do during the 2000s.

None of the technology that was

Leap Motion isn't perfect, but the potential for new UI capabilities is exciting

achieved by Apple, Amazon, Facebook or Google was particularly revolutionary. It was all pretty straightforward stuff, but it required vision and the ability to bring teams together to create a coherent future. That's the proper role of a CEO, and Ballmer's inability to chivvy Microsoft Research into building such a coherent and forward-thinking plan has been his undoing.

Has he decided to go or has he been pushed? Some might say "who knows, who cares?", but you can get some indication from the share price, which leapt on the news (by enough to make the already eye-wateringly wealthy Ballmer worth almost another billion). One of Microsoft's ongoing strengths has been the way it's been able to conceal its loss-making operations within larger more profitable ones; it's hard to see the really poorly performing areas when they're swamped by the money-making machines. But when the recent write-down of unsold Microsoft Surface RTs' value ran to almost $1 billion, it was no longer possible to pull that trick. I expect the board and major investors were so furious that they chose this as the bullwhip with which to finally force Ballmer out.

Who will take his place? One thing's for sure: Microsoft really needs a Steve Jobs right now. Someone with the vision to define what the company should look like in 2020 and 2030, and the drive and determination to push it through. Someone with aggression enough to twist the necks of a lethargic, lazy and inward-looking upper management until they're looking outward into the real world again. Only time will tell whether Microsoft still has anyone brave enough to do it.

JON HONEYBALL
Computer journalist and consultant specialising in both client/server and office automation applications.

LEAP MOTION

You may have noticed the utterly damning review of the Leap Motion Controller in this issue. It couldn't have been any worse: the product failed to deliver anything useful in any meaningful way. I'd be the first to jump in and agree, except that I'm far from convinced this is the right answer.

Let me explain. Anything that breaks out of the conventional UI rut of mouse and keyboard or touchscreen is a good thing. I wouldn't claim that it's ideal for all possible uses, that would be a miracle. Clearly there are times when a keyboard is the right choice, or a mouse, or a pen and digitiser, or a touch surface. But there's also a need for a fully 3D spatial-recognition system that lets you move your hands and fingers around in space, and have the computer understand what you're doing. Anyone who saw the film Minority Report would immediately have wondered why Windows couldn't have a user interface like that.

Years later, we're still asking that very same question. Operating systems such as Windows and OS X, and pure touch UIs such as iOS and Android, really have absolutely no idea about depth ("Z-order" if you wish to use the technical term). Sure, it's possible

> Without technology like Leap Motion, we'll endure years more of UI stagnation

to "bring a window to the front", but beyond "front" and "desktop" as layer constructs, there's really no place in between. It doesn't have to be this way – the powerful GPU-based graphics engines fitted in even the most humble of today's devices can resize and re-render windows with little or no CPU overhead. It should now be possible to move things back and forth in the Z dimension of desktop space, so they simply appear bigger or smaller as they advance or recede.

Why don't we have this yet? A combination of factors really. First, when pushing a window inwards, you wouldn't need to go too far before its contents became impossible to read. Hard decisions need to be taken about how zooming should be coupled to blurring and then simple greying out of content. We also lack any meaningful gestures for control zoom in this dimension, although it should be within the capabilities of a three- or four-finger gesture sliding up or down a touch surface to indicate such a manoeuvre. Ideally, we'd want a properly three-dimensional space in which to touch things and move them, including back and forth, and this is where the Leap Motion Controller comes in.

Before reading any more about Leap Motion, you might be muttering "what about Microsoft's Kinect for Windows"? Well, yes indeed, what about it? Have you seen any support for it in any meaningful product or platform? Me neither. I asked the development team, when I was last in Redmond, why it wasn't already being built into laptops. The answer was that one of the necessary cameras – the 3D heat camera I believe – requires a 12V rail and quite a lot of power. It just wasn't possible to build it into a laptop without killing the battery life, hence the need for a separate mains power supply.

The Leap Motion Controller operates with a set of infrared lights that shine upwards, plus a camera. Using this relatively simple setup, it can work out where things lie in the 3D space above

it. Deceptively simple, but definitely capable of being built into and powered from a laptop device, perhaps just in front of the touchpad.

Getting this system up and running isn't easy, although there has been a flood of updates, firmware changes and so forth since launch. Getting Windows support requires that you dive into the online shop and download a free applet, at which point the harsh reality sets in – you can move a mouse pointer around and do the equivalent of clicking by poking forwards into 3D space, but it isn't at all comfortable and doesn't work very well. It becomes confused if you stick your thumb out, while small, fine movements require a lot of manual dexterity. Worse still, you have to hold your fingers extended into 3D space, which pretty soon becomes tiring and cramp-prone. Trying to type through an interface like this would be frustrating in the extreme.

So I can fully understand the frustrations that the *PC&TA* reviewers experienced with this product. If you're looking for an instant whizz-bang replacement for your keyboard and mouse, then the Leap Motion is so far from being that product as to be almost laughable. But for me that isn't the point. Without hardware like this, it isn't easy to envision any truly new UI capabilities and ways of working with data. It's a chicken-and-egg problem: we need this hardware to get developers working on a set of tools and supporting apps, and without technology like Leap Motion we'll endure years more of UI stagnation. Frankly, we need one of the very big laptop vendors to step up, grasp the vision and service proposition, and bring this to market properly.

So I'll freely confess that I love my Leap Motion devices. I have no real use for them on a day-to-day basis, but they're a permanent reminder of just how much stagnation we've endured since Windows 95. Is that really it for the next 20 years? Does anyone really like using the touch panel on an Ultrabook? The hinge isn't even strong enough to prevent it from boinging backwards whenever you touch it, at least in my experience.

So should you buy the Leap Motion Controller? It isn't expensive, and if you're interested in leading-edge technology and love to ponder what could be, give it a try. If not, then it's just a chocolate teapot, and you should follow the advice of our main review.

> One thing's for sure: Microsoft really needs a Steve Jobs right now

CENTRALITY

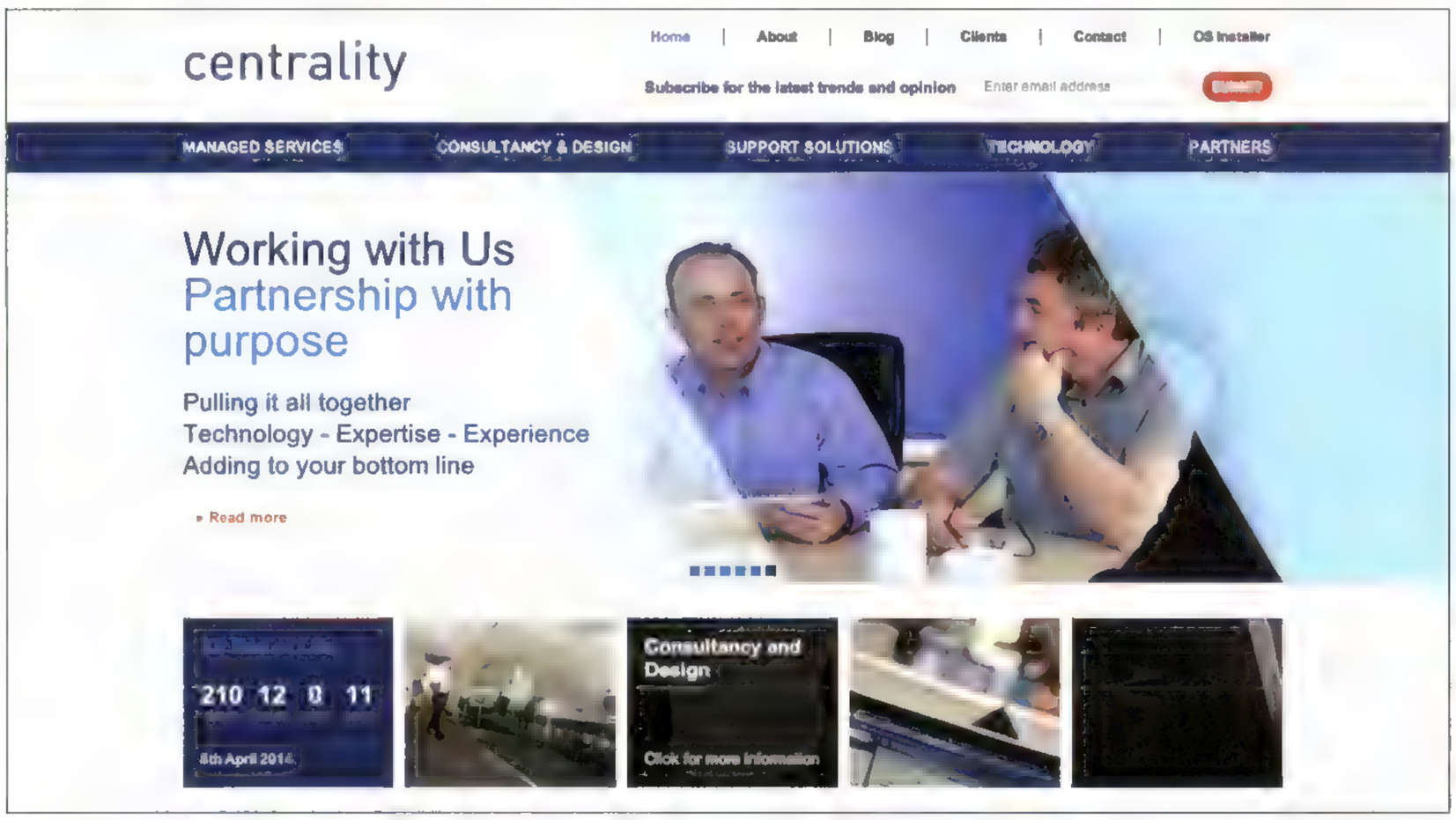
Ask a systems administrator what magic wand they'd like to be able to wave over their business desktop infrastructure, and they'll reply "one that can flatten the entire thing in one evening before going to the pub, and cause all desktops to be reinstalled with correct versions of the OS, apps, hardware-specific drivers and such, ready for the users to log back in the next morning". In other words, a wand that can clean-disk refresh their entire network.

Doing this is no small task, and can require heavyweight investment in systems-management tools, so I was intrigued to visit Centrality, a small software development and IT support house in deepest , darkest England last week. Centrality has written a toolset to do exactly this. In essence, you network boot the computer, which brings down a Windows PE-based loader and application. Windows PE (for pre-execution) is the stripped-down version of Windows that can boot from read-only storage, and is designed for just this sort of task.

The loaded app gathers a whole pile of information about the machine – CPU, RAM, vendor, PCI bus configuration and so forth – and then chooses the appropriate set of bootable Windows installation packages from a server. This could be any version of the Windows OS, from Windows XP 32-bit to Windows 8.1 64-bit, and you can add in any number of applications to the process: maybe this machine needs Office 2010, but that one needs 2013. Driver packs can be added into the mix, too, and it can even perform firmware upgrades on the hardware during installation. All of this can run hands-free if required.

Centrality's demo suite was made up of a dozen machines, the oldest of which was around a decade old, and the youngest a new Lenovo Yoga touchscreen Ultrabook running Windows 8.1. We kicked off an installation and within about 15 minutes all the machines were flattened, reinstalled, patched and firmwared, all without any meaningful user intervention. In the case of a device with a USB/Ethernet adapter that is unhappy doing a PXE boot, you can boot a machine from a USB stick. You could even boot the machine from a USB stick and have it pull down the installation set from a remote server, rather like you can do system recovery on a Mac from remote servers.

Overall, Centrality looks very interesting. It isn't quite a product yet, and needs a little work to bring it to a packaged solution that can be deployed by anyone, but I'm confident the company can get there over the next few months. Cost? Centrality was unsure, but made muttering noises around the $10 per machine for an unlimited-use licence. Frankly, that's far too cheap for something that would allow me to flatten my 500 desktops every week and know they're fresh, clean and ready for work. If you're a sysadmin looking for interesting tech to help take stress out of your network, then this product could be a big leap forward.



Centrality is working on a toolset that could be a game changer for sysadmins everywhere

KEEP ANEYE OUT

I can't recommend Centrality unequivocally until it's finished, packaged and pricing is finalised, but send Garry Stubbs an email at gstubbs@centrality.com and tell him I sent you. The website is www.centrality.com and I'm going to be keeping an eye on this over the coming months.

Training to stay job-fit

FIONA TEAKLE PONDERS THE IMPORTANCE OF TRAINING AND STAYING UP TO DATE.

We live in a world where things are constantly changing. New technology is being released, new theories and methodologies are being taught and all this is leading to companies changing the way they do business. So what does this mean for you?

For most people we spend the first 20+ years of our life in school or university learning a certain way to do something. We are being taught to keep learning, yet after most of us finish university we are so tired of studying that we make a conscious decision to not study or learn new concepts for a number of years. At the Young IT professionals conference YITCon last year in Sydney, a number of keynotes spoke about ensuing they have the right people for the roles. So how can you ensure you are someone who is right for the role you are applying for, and more to the point the person the companies are looking for?

Ongoing training and professional development may take shape in various forms and there is not one method that will suit everyone. Everyone has their own ways in which they prefer to learn. The methods you may use could include online short courses, podcasts, face-to-face workshops, vendor certification or ongoing university studies – the list goes on.

> Everyone has their own ways in which they prefer to learn...

Understanding new techniques in your area of employment ensures you are working in the most innovative and efficient way possible. If you are still using an old technique it may set you back or may mean you are overlooked for the next promotion in the office. While I understand companies may have a certain way of doing something, there may also be an opportunity for you to invoke change based on what you may learn. As the internet continues to change the way we work, it is also providing many new ways for ongoing training. The internet has opened up ways to gain access to international speakers and training that were not previously available. Ensuring that you are taking full advantage of what is at your fingertips can only be beneficial.

FIONA TEAKLE is Director of the ACS Young IT Board. You can contact her at fionateakle@acsmail.net.au

While online training provides a constant source of high-quality training there is also something to be said about face-to-face training. One of the skills that many young IT professionals lack is around soft skills. The ICT Workforce study by the Australian Workforce and Productivity Agency, states despite the young age profile of the ICT workforce, there appears to be a limited number of entry-level positions for persons in the 20 to 24 years age group, with many employers complaining that tertiary graduates do not possess the desired combination of technical and complementary business and communication skills to contribute effectively in the workplace. So where does this leave you? Do you think you are adequately prepared to enter the workforce or progress up the corporate ladder?

Identifying and understanding where your gaps are prior to graduating or as you progress in your career provides you with a chance to do something about it. Start to think about what some of your weaknesses are and what may prevent you from getting your dream role. After identifying weaknesses you can then create a plan for how you can start to turn the weakness into a strength.

Being prepared and understanding what is going on around you now is important; however it is also just as important to be looking into the future and preparing for that. The ICT industry is constantly changing, and changing other industries with it. It is critical that we all remain on top of what may happen in the future and ensuring we are open to change. However you cannot be fully prepared for what may happen in the future if you do not understand what is happening around you today.

One of the benefits of being a member of the ACS is the access to the professional development courses offered around the country. These courses are mainly face-to-face, but cover a range of topics to ensure rounded professionals within the industry. For some it may not be possible to attend a course they are interested in – so, in order to assist in continued learning and make it as accessible as possible, the ACS has launched an online portal, which provides members with access to high definition play-on-demand vodcast recordings of ACS professional development events which will contribute to their CPD and allows them to learn from key influencers of innovation, both in Australia and internationally.

For student members and international members there is also a range of online courses available. The portal allows you to customise a learning plan to address specific development goals and keep track of frequently accessed learning assets.

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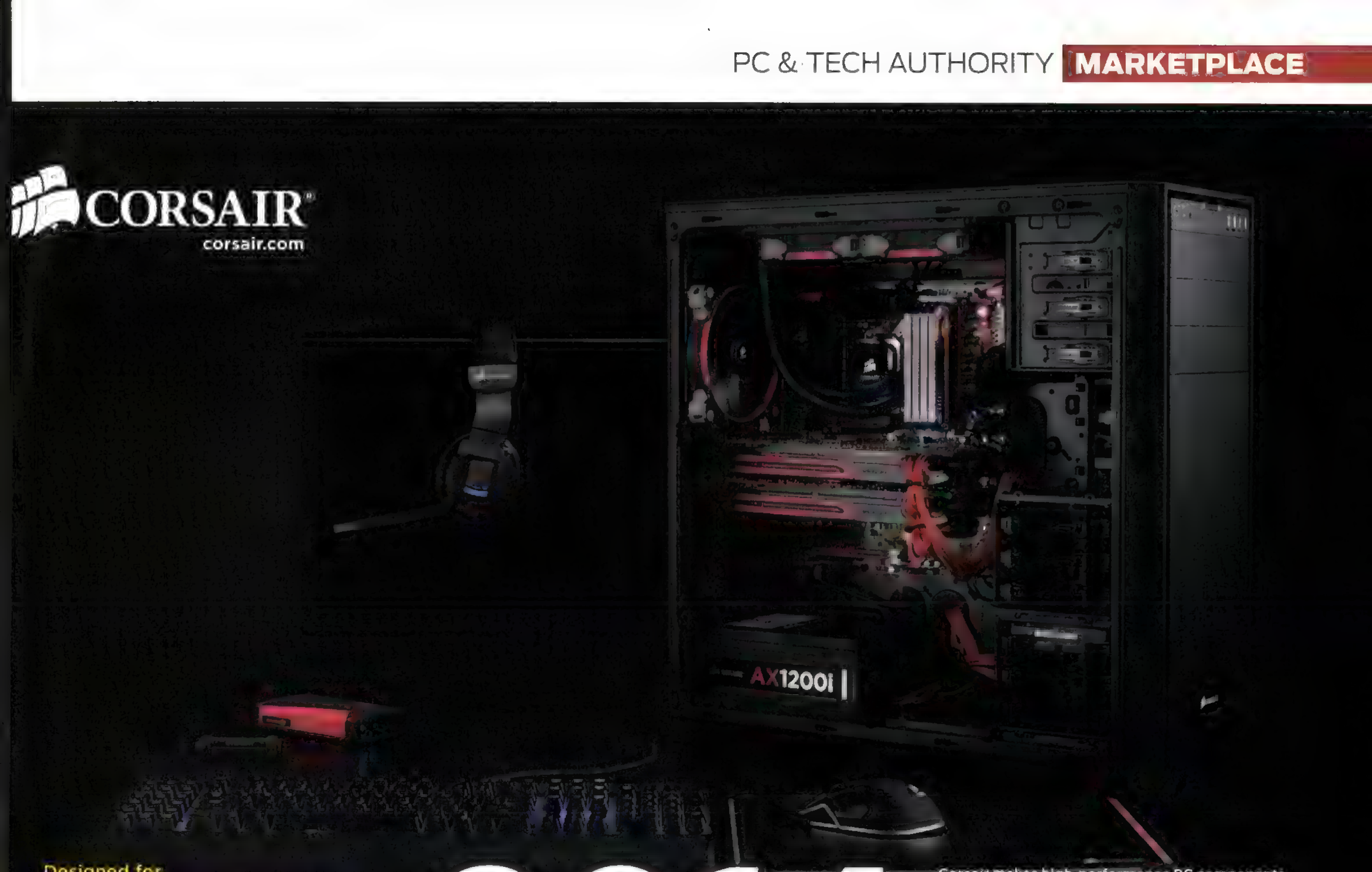

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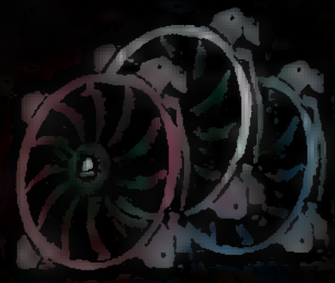

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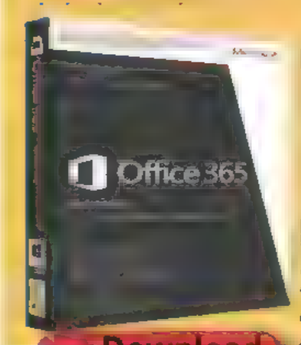

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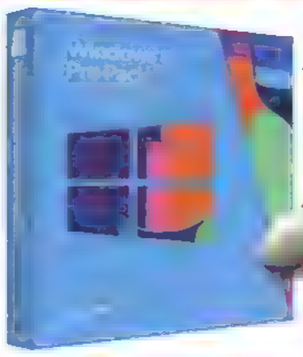

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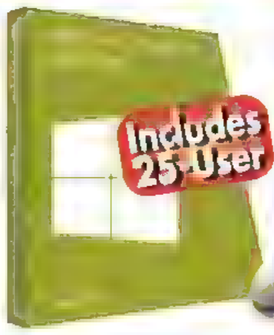

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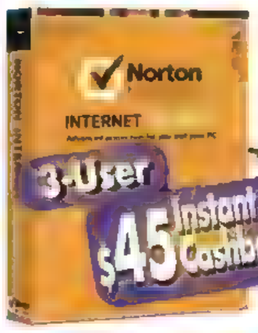

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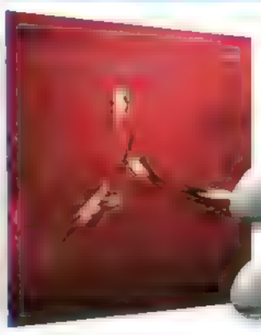

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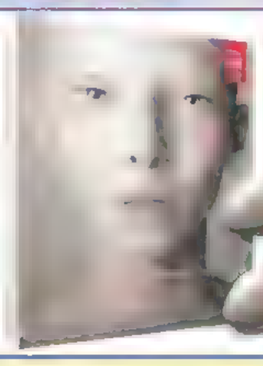

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Extend HDMI signal to multiple receivers over a Gigabit network

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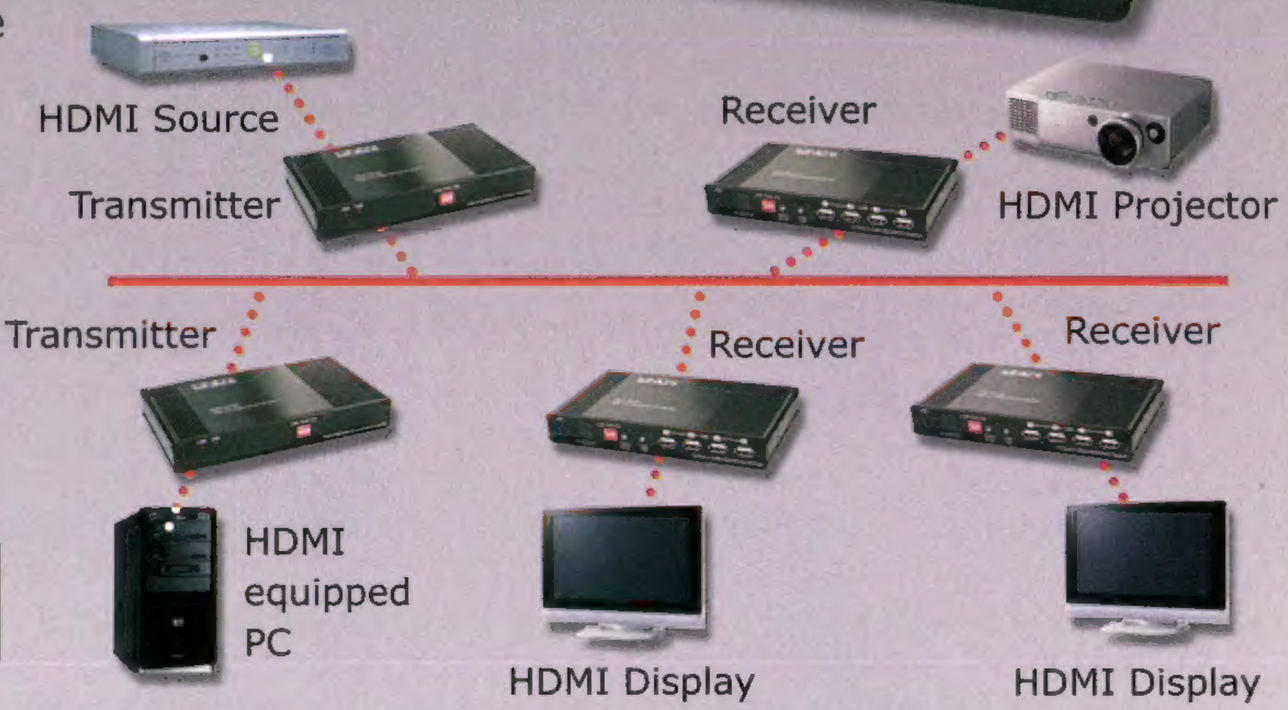
Our HDMI Broadcast System sends HDMI signals over a standard CAT6 cable up to 100m in length or via any standard Gigabit Ethernet network. It consists of transmitter and receiver units which can be purchased as required. It's possible to use the system either in a 1-to-1 or 1-to-many configuration, or as a matrix with up to 16 transmitters. In addition to HDMI, USB, infra-red remote control and RS-232 signals can also distributed. To set up a KVM control system, a monitor, USB keyboard and mouse can be connected to a receiver allowing full remote control of a computer connected to the transmitter.

- Designed for use with digital signage, home theatre, professional AV, multimedia and control centre installations
- Extends HDMI and DVI-D signals via 1000Base-T Gigabit Ethernet or a single CAT6 cable (up to 100m, not included)
- Also extends USB, RS-232 and IR remote control signals
- Supports Full HD 1080p and DVI-D Single Link up to 1920 x 1080
- Supports infra-red remote signal transmission to the HDMI source
- Transmitter and Receiver units sold separately



HDMI Gigabit Ethernet Transmitter	38066	$349.00
HDMI Gigabit Ethernet Receiver	38067	$379.00

CAT6 HDMI & IR Extender Pro, 40m

Extend an HDMI 1080p 3D signal using low cost network cable up to 40m

CAT6 HDMI & IR Extender Pro, 40m	38002	$299.00

- Allows HDMI video and audio signals to be sent up to 40m using low cost shielded CAT6 cable (not included)
- Extends IR signals, Transmitter and Receiver units included
- Supports 1080p 3D (HDMI v1.4a)
- Supports HDTV resolutions up to 1080p
- Suports DVI-D Resolutions up to 1920 x 1200 (WUXGA)
- Supports multi-channel High Definition Digital Audio, including Dolby Digital True HD and DTS-HD
- EDID Copy function built in to the transmitter unit
- IR Frequency: 38KHz

Full HD 1080p

3 and 5 Port HDMI Switches with IR Remote

Connect multiple HDMI devices to a single HDMI input

- Ideal for use with Blu-Ray and HD-DVD players, HD set top boxes, PlayStation 3 etc.
- Infra-red remote control for easy switching (battery included)
- IR sensor with 1.2m cable for optimal positioning
- Supports Full HD resolutions up to 1080p and 36 bit deep colour
- 3D compatible and HDCP compliant
- Supports total combined cable distances up to 30m (15m in, 15m out)
- Connectors: 3 x HDMI Female (input); 1 x HDMI Female (output)

3 Port HDMI Switch with IR Remote	38034	$34.95
5 Port HDMI Switch with IR Remote	38035	$49.95

Full HD 1080p

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Only driverless cars can make commuting bearable, says JON HONEYBALL

On a few occasions recently, I've had to commute into the city from my suburban home. It's not far – around an hour on the train, which trundles into Kings Cross, or a fast run down the highway.

Given the choice, I prefer to jump on my motorbike. But this doesn't always work out, as was the case last week when it poured down and traffic came to a standstill. No amount of bravery pills will get me weaving through stationary traffic in that rain.

Going by train is an even worse experience, akin to sitting in a stretch limo with complete strangers. It wasn't helped a few weeks back when one poor chap managed to projectile vomit over his companion sitting opposite. Not a good way to start the day – nor a good treatment for an expensive suit and tie.

I can't see how anyone can commute into Sydney on a regular basis, even when armed with a music player, a smartphone and a tablet to temper the tedium. I understand that some of my colleagues have done so from the south coast on a daily basis for years. How, I have no idea.

The run to my office is simplicity itself: nine miles of main road or picturesque lanes, either by motorbike or car, depending on the weather. It's far enough to keep work away from home, but close enough that I can drop in out of hours if necessary.

The only way to make the experience better would be to use a fully automated car: the sort you get into, tell it where to go, then fall asleep, preferably armed with a large gin and tonic.

We're moving towards such a position. A number of cars now have high-end speed-sensing radar, and some can automatically brake if you've ignored the stationary vehicle in front of you. There are also technologies that can spot road lines and warn you if you're veering off course. What's more, the ever-increasing amount of CPU power means the modelling of crash modes in cars is becoming fantastically clever. Volvo has said it hopes no-one anywhere in the world will have a fatal accident – or even suffer an injury – in one of its year-2020 cars. If that's achievable, it's a huge step towards automation, since it will ensure that you won't be killed if something goes wrong.

"Volvo hopes no-one anywhere in the world will have a fatal accident – or suffer an injury – in one of its year-2020 cars"

My chief concern with automated vehicles isn't safety, but rather liability. If my car gets it wrong and crashes into another car, who's to blame? Is it me? My insurance company? The vendor of my car? The company that wrote the software? Indeed, why would I need to have car insurance if the car is claimed to be intelligent enough to drive itself? Since I'm not in the control loop, it's hard to see how I can be held liable for something I didn't do.

Perhaps the vendors will do their best to write a service-level agreement that runs along the lines of "you can't drive this car, but you're liable for anything it does", thus requiring you to take out insurance to cover yourself for this eventuality. Will you be considered to have contributed negligently if you dare to drive an old-fashioned manual vehicle? In other words, will human control have an additional excess to consider?

I confess, I enjoy my daily trundle to and from the office: it's a brief respite from dreaded phone calls and the internet. I wish it wasn't so stressful, though. This morning, for example, people were driving in heavy mist with no lights on at all, but when I came to a queue, others couldn't extinguish their fog lights, despite the next car standing stationary only ten feet in front of them. Maybe we should put our faith in this technology. Surely it can't do a worse job than a significant proportion of the populace today?

So that's the commute sorted. Those who have to travel into the city can simply punch the office address into the satnav, catch up on Breaking Bad and do a spot of knitting en route. When they get to the office, the car can park itself and wait patiently for the journey home at the end of the day.

Oh. Unfortunately, that requires a parking space and road infrastructure, both of which simply aren't there. Let's join these automatic cars together and call them a train. Damn – we're back to the sardine-tin unpleasantness of standing for an hour with someone's armpit in your face.

How about refusing to work for firms that decide to inhabit the centre of Sydney? Use Skype, embrace the modern era of the interwebs and work out of a local town hall. It's called having a life.

I recommend it.

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GAMING

RIG™

STEREO HEADSET + MIXER FOR PC/MAC, XBOX 360,® PS3,™ MOBILE

PLAY MORE. PAUSE LESS

LIFE COMES TO GAMES

GAMES COME TO LIFE

Take calls. Keep playing.

Game + Voice Chat

Stream your audio

DESIGNED FROM THE GROUND UP TO KEEP YOU CONNECTED, RIG BLENDS GAME + CHAT WITH MOBILE AUDIO, APPS, ALERTS, AND LETS YOU TAKE CALLS ON THE FLY WITHOUT HITTING PAUSE.

PLAY MORE. PAUSE LESS.

Connect your phone to the RIG mixer and never stop when you get a call—just punch the paddle to answer.

EPIC AUDIO.

Feel the game and boost your music with serious gaming gear from Plantronics. Precision stereo, crystal-clear voice quality, and three EQ profiles: Pure. Intensify. Seismic.

GAME ON.

Two mics – one to game, one to go. Swap out the boom mic/cable and jack in the stealth inline mic with mute and call control – for music or gaming on the go.

PLAY ANYWHERE.

Connect to your gaming and mobile devices: PC/Mac, Xbox 360, PS3, smartphones, and tablets.

FEATURES

- Mixer connects and mixes mobile phone with game audio
- Interchangeable gaming boom mic and inline mic
- Connects to PC/Mac, Xbox 360, PS3, smartphones, and tablets
- Three EQ profiles: Pure. Intensify. Seismic.
- 40mm speaker drivers

Headset available in black or white.

XBOX 360 PS3 PC/MAC MOBILE

2 Year Replacement Warranty

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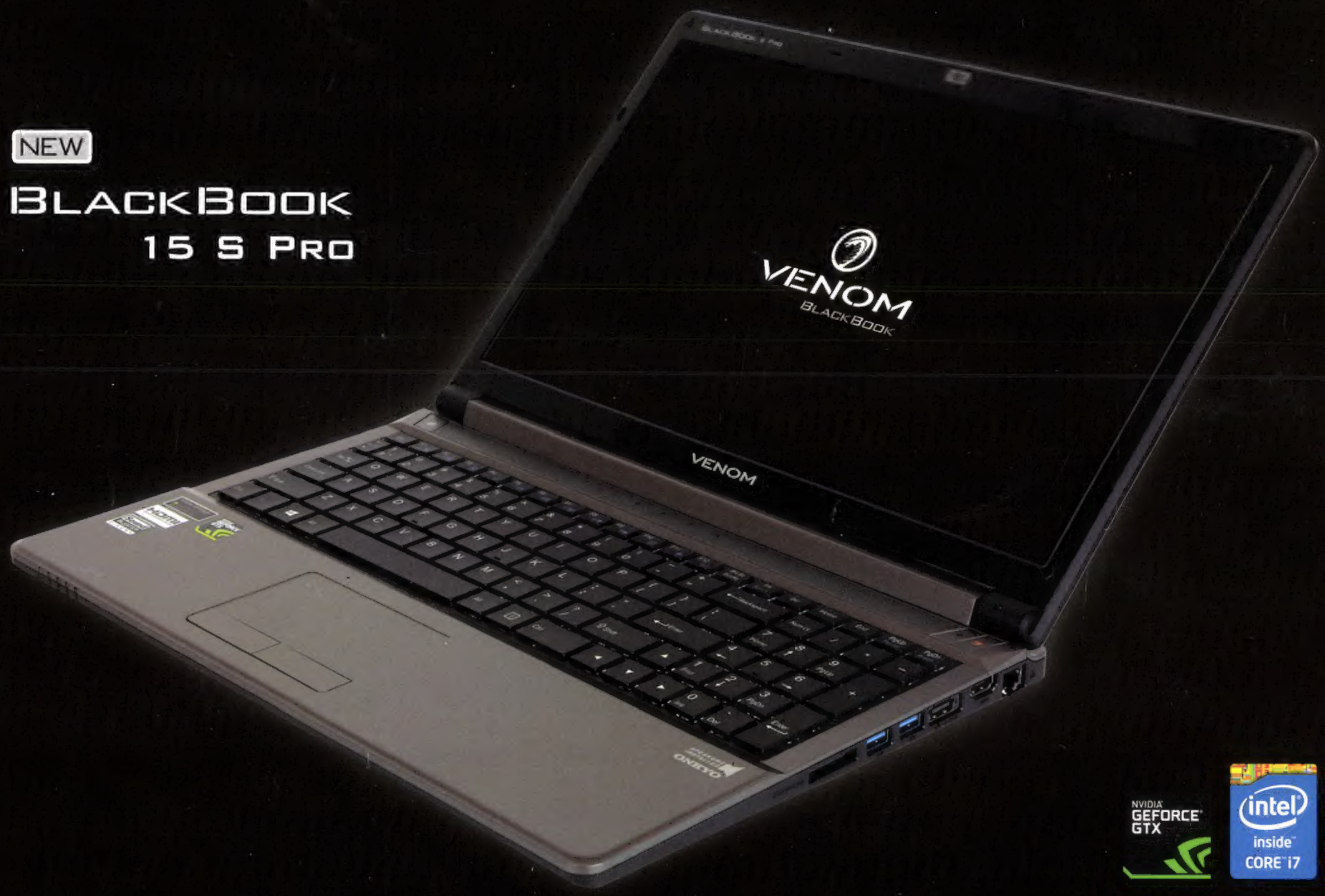

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